A GROUP OF RESEARCHERS AND EXPERTS COORDINATED BY CIRAD, GRET AND IRAM

Draft Summary
GREMA Study

Managing Food Price Volatility for Food Security and Development

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With the support of:

MINISTÈRE DES AFFAIRES ÉTRANGÈRES ET EUROPÉENNES
MINISTÈRE DE L'ALIMENTATION DE L'AGRICULTURE ET DE LA PÊCHE
AGENCE FRANÇAISE DE DÉVELOPPEMENT

25-11-2010 Draft version

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Introduction

The fight against the price volatility of agricultural and food products and, more generally, public intervention in agricultural markets are longstanding subjects of debate among academics and the government authorities of various countries equally. Trade and market regulation are the crux of this debate between those in favor of liberalization in the strict sense and the supporters of intervention or of more or less moderate regulation. Other actors' organizations (such as farmers' and consumers' unions, local and multinational companies, and NGOs in different fields) are involved. This is because the level and instability of agricultural and food prices have considerable consequences for all citizens of the world and in particular for those near the poverty line. Indeed, for poor consumers, a sharp rise in prices means entering a situation of hunger and/or indebtedness, and for poor farmers, a drop in prices begins or speeds up a process of impoverishment, loss of land if the farming household was forced to mortgage its last assets, and ultimately eviction. Every year, more than twenty million people find themselves pushed out of farming in this way and join already completely saturated urban areas and labor markets. It is not surprising, in this context, that, for years, this issue has stood as a major obstacle in international trade negotiations.

In the spring of 2008, the sharp rise in prices, which hit the urban poor hardest, sparked riots in many cities in developing countries close to national and international authorities and under the eyes of television cameras. According to the FAO, one hundred million more people were added to the hunger statistics in 2008. The specter of hunger reared its head, and the debate on markets was revived. The shunned idea of regulation and public intervention re-emerged in forums and at the very center of international negotiations. Accountability was demanded of the international organizations in charge of agriculture and food; and, to sustainably raise the issue of food security at the highest level, the G8 and United Nations began to elaborate a "Global Partnership for Food Security." This lead to the opening up of the FAO's Food Security Committee (FSC), the mobilization of global expertise by creating a panel of high-level experts, and additional financial efforts devoted to the development of food crops. For its part, the G20 has expressed alarm at the deregulation of markets, first the financial markets, then the commodities markets and finally the agricultural markets. France, which assumed the presidency of the G20 in November 2010, included the issue of regulation in these three—closely correlated—fields on the agenda for the next summit.

The Groupe de Recherche et d'Échanges sur la Régulation des Marchés Agricoles (GREMA, agricultural market regulation research and exchange group) was created by NGO activists and scientists somewhat in the minority at the end of 2004 to elaborate the positions to take and arguments to defend in the process of preparing for the WTO Ministerial Conference in Hong Kong (December 2005). Five years later, against the backdrop of a serious blockage of WTO negotiations, GREMA has found itself involved in a debate on market regulation that is now more open and has been introduced within the G20 by some member countries. GREMA's study, delivered to the French authorities prior to the G20 presidency, offers analyses and proposals elaborated based both on theoretical reflections and the observation of experiments with regulation attempted in approximately fourteen countries. This report is an extension of other studies that were previously conducted in a similar vein, notably the study produced by the ECART group. However, let us point out that, well before the 2008 crisis, while the major international order-givers and most governments, relying on pro–free trade convictions, affirmed the dangers of public intervention in the life of markets and denounced the upsets introduced in their natural tendency towards optimal equilibrium, the same could not be said of other actors concerned by the organization of agricultural trade, starting with agricultural farmers' organizations and international solidarity associations who saw the damages in the field caused by the policies inspired by an uncompromisingly liberal doctrine. Nevertheless, the liberal discourse of governments coincided often poorly with the policies implemented and negotiating positions. If proof is needed, it suffices to review the stages in the

trade negotiations over the past decade and a half, for instance the WTO Ministerial Conferences, and examine the tone adopted in them: 1994 in Marrakesh, end of the Uruguay Round, creation of the WTO and announcement of the launch of a new negotiation cycle; 1999 in Seattle, failed launch of this new cycle, informal alliance between developing countries and non-governmental actors within a movement described as "anti-globalization" before it adopted the term "alter-globalization"; 2001 in Doha, one month after the events of September 11, obligatory statement of good intentions but without results; 2003 in Cancun, new blockage; 2005 in Hong Kong, timid proposal of a negotiation framework and methodology; then no forward movement until July 2008 in Geneva where, during a special meeting, India came out of the woodwork and, with its alliances (notably with Brazil), blocked the negotiations by demanding the right to invoke a safeguard clause in the case of market surges—a demand that was refused. Since then nothing, dead calm on the negotiating table, and attention has shifted to how the food crisis was handled, to the need to reformat the international mechanisms in charge of food security, and to the search for practical solutions to enable markets to operate properly. This report aims to find answers on this last point.

1 – Status of the Debate and Background Issues

While the issue of market regulation is not new—one can recall the common agricultural policy during the heyday of the levy/refund mechanism or during that of supply control through the setting of dairy quotas for each farm; one can also recall the establishment of international product agreements and the Common Fund—the debate around the notion of regulation is now situated in a new context that can be described rapidly as follows:

- No one—or almost no one—now denies that the market has a central role in organizing trade on all geographic scales, trade in which billions of farmers and consumers as well as millions of micro- or macro-businesses participate. It is no longer a matter of planning flows or setting prices. For everyone, markets must be able to "live their lives" and continue to be the breath of the economy. This does not prevent one from noting that market deficiencies and failures do exist, that markets can be manipulated, and that the most powerful and best organized actors can subjugate markets. Furthermore, everyone is aware that the economic field in which markets operate and "merchandise" is sold covers only some of humanity's concerns and cannot be assimilated with the general interest. It is not the market's job to be concerned with enforcing universal rights, the sovereignty of peoples and nations, the preservation of nature and the common heritage, etc. The expansionism of the market, which operates by turning "things" into "goods" and public goods into private goods, must be contained within the bounds that it is up to lawmakers to define and the public authorities to enforce. There can be, and often is, a contradiction between the dynamic of market expansion and respect for the general interest. There are limits to what is acceptable and what is not that must not be crossed and, in the field of agriculture and food, what is unacceptable is mass hunger, the degradation of the common heritage, and the massive exclusion of hundreds of millions of farmers towards economic and social nothingness. When things get out of hand on the small scale, they can be overcome with aid or social policy, but when there are massive, lasting and cumulative upsets and imbalances, one must envisage tackling the analysis and treatment of the causes of these unwanted changes.

- The globalization of agricultural markets and their financialization have increased in recent years. The integration of markets into a large global market has developed in line with natural market dynamics but also thanks to proactive policies to open geographic borders as well as the struggle against all obstacles likely to hinder trade. This integration was supposed to lessen the volatility of agricultural markets through offset mechanisms between deficit and excedent zones or periods. This assumption has not been confirmed in recent years. This market integration bluntly raises the question of the contagion of market ills, and the measures to take to protect against them between two or more national markets and between one or more national markets and the global market. In

recent years, market integration has been accompanied by strong financialization of agricultural trade. This trade was not of particular interest for international finance, which found more profitable and less risky prospects elsewhere. The crisis in financial markets, agricultural price volatility and the prospects of raising price levels generated strong speculation movements that themselves increase volatility. The instability of financial markets and the strong variations in exchange rates have become major elements in the instability of agricultural markets, and this does not simplify ways to address this instability. P. Chalmin has compared the attempts to stabilize agricultural markets to trying to stabilize the surface of water in a sink in a sailboat navigating a stormy sea! Agricultural markets are increasingly correlated to other markets, for example the energy market. Unable to hope for general stabilization, one must therefore evaluate to what extent it is possible to protect oneself from the instabilities of neighboring markets.

- Everyone, or nearly everyone, believes that the exaggerated volatility of prices and their excessive unpredictability have harmful, even dramatic, consequences for farmers and consumers. For farmers and producers near the poverty line, sudden price hikes or drops can have catastrophic consequences, as we indicated above. But for all farmers, this unpredictability greatly hinders farm innovation and investment, that is to say farm modernization, particularly when these investments require one to commit most of the household's assets or borrow heavily. When a farmer is at the edge of poverty, taking risks is neither responsible nor even possible. It is difficult to correctly measure the scope of the silent dramas occurring in the countrysides when poor farmers are faced with the necessity of overcoming this rule of prudence. Because, in most countries around the world, countless peasants are in crisis. For instance, think of the "suicide belt," the districts around Andhra Pradesh and Karnataka in India. There, over the last ten years, several thousand peasants committed suicide, victims of the fall in cotton and groundnut prices and prisoners of the "debt trap" because they had to mortgage their last plots of land. The "center for social development" in Hyderabad mentions seventy suicides every week, 55% of which involving men between the ages of 31 and 45! The dramatic consequences of price volatility are now universally known. More and more experts admit that curing only its consequences without addressing its causes is insufficient. Of course, social and economic urgency – for instance, when many farm are all on the edge of bankruptcy – may call for social policies and safety networks. But beyond such situations, these policies that only mask problems are questionable. On the one hand, they alter market signals, sending producers erroneous information regarding scarcities. On the other, they are costly, with enormous budgetary outlays for the countries that can afford them, but out of reach for the less affluent countries that, indeed, would need them the most.

As a consequence, more and more experts believe that the very causes of the price volatility must be tackled, and, to this end, one must first determine what they are. In chapter 2, the corresponding theory has been revisited. A distinction has been made between two sorts of causes: exogenous and endogenous. Then, in chapter 3, actual policies put in operation in fourteen countries have been evaluated in the light of the above analysis in order to see to what extent the latter correspond to reality. Finally, chapter 4 describes the actions that have (or could have) been envisaged at the international level. The conclusion is that to improve consumer safety and enable the modernization of agriculture, it is therefore appropriate to envisage placing limits on price volatility—that is to say, negotiate the price ceilings and floors that will determine the bands or ranges that are acceptable for both producers and consumers and sufficiently wide to allow markets to live their lives as markets. To be accepted by all the parties present, these bands/ranges must be negotiated with all the actors concerned. These are sensitive negotiations because these actors usually have conflicting interests, all the more as wisdom would dictate that the bands not be too different from the price levels practiced in international markets if one wants to avoid excessive external pressure and the emergence of a black market economy. Once the ceilings and floors have been set, an authority will still need to have the power and resources to keep prices within acceptable ranges. And, to do so, this authority must have a range of tools that allow it to intervene on both the supply of products—

that is to say primarily on national production, imports and de-stocking—and on demand, that is to say first on national consumption, export, stocks and the diversification of agricultural products toward non-food uses. A panoply of measures must, in this way, make it possible to improve the predictability of price changes so as to limit disruptive and self-fulfilling anticipations, a major source of volatility. We shall analyze this panoply of instruments, regulations and measures throughout this study, keeping in mind the fact that cures for the causes of price volatility will not cure other ills. For example they will be inactive in fighting inequalities. The reduction of inequalities requires other cures, for example agrarian reform if the crucial question is land access, or policies supporting poor producers incomes or the most deprived consumers, or fiscal policy allowing wealth redistribution.

- After the food crisis in 2008, the need for market regulation and the necessity of fighting price instability have been accepted by a growing percentage of experts and decision-makers, but doubts remain as to the public authorities' real power to intervene on the factors of market instability, as do fears about government leaders' ability to resist—in certain socio-political situations—the temptation to use this power and these regulatory instruments to serve private, even personal, interests rather than use them to defend the general interest. We shall see that the rigor with which regulatory actions are implemented, the objective and predictable conditions that trigger these actions, and the democratic control of leaders and their actions are decisive, and that for each of these questions, measures must be taken to ensure the credibility of market regulation policies. Nevertheless, these doubts and fears, while they inspire caution, must not cancel the need to fight market instability. Let us say, first, that all the actors concerned by agricultural markets—and even other actors that provide no value added and therefore in theory have no place in these markets—intervene in these markets and do so according to their own interests. This being the case, one can wonder why a public authority mandated to defend the general interest could not intervene to avoid the serious consequences for consumers when prices rise above the ceiling, or the serious consequences for producers when prices fall below the floor price. While we acknowledge this mandate for the political authorities, two questions that we have not asked remain: that of the authorities' real power to intervene, and that of corruption in the use of regulatory instruments.

Taking into account regulatory bodies' real power and the existence of safeguards to avoid abuses of power is decisive for the design and choice of regulatory instruments. Indeed, at present, there are numerous limits to the affirmation of national sovereignty and, even more, to the emergence of a real international authority; and the safeguards that could emerge as opposition forces are deficient. This is the "policy space" issue being weakly debated in international negotiations.

- Limits to the affirmation of national sovereignty and the emergence of an international authority exist. First, there are the WTO agricultural trade agreements, which serve as the keystone of and baseline for all trade agreements, and which determine what is forbidden and permitted when it comes to trade and public agricultural policy. Then, there are the conditions, notably those that address market openness, imposed by international financial institutions during the negotiation of loans and the repayment of public debt, and during the distribution of international aid. Next, there are the quality of statistics and the ability to analyze very imperfect data and predict changes in the markets. Finally, there is the poverty of public instruments able to allow regulatory action: customs administrations and border control agencies, agencies in charge of verifying compliance with the rules by the various market actors, law enforcement, storage infrastructures, etc.

- The corruption of regulatory instruments exist as well. Market interventions to avoid market instability and keep prices within acceptable bounds create opportunities for corruption or insider trading, especially when intervention decisions—public purchase or sale decisions, allocation of import or export permits, cession of production quotas, etc.—are unpredictable.

Issues Addressed by the Study and Organization of the Study

Should state intervention be limited to creating a conducive environment for private activities through the provision of public goods such as infrastructures and political and economic stability, or are direct interventions of the state on markets sometimes desirable? In particular, is it necessary to allow a real improvement of food security in the world's poorest countries? Or are more market-friendly interventions, such as warrantage or insurance subsidies, possibly combined with ex-post compensation for poor consumers, better suited to the situation.
Is the direct intervention of the state on markets feasible? Or are the difficulties, costs and inefficiencies associated with public interventions combined with the positive impacts on stability expected from trade liberalization in a favorable market environment sufficient to give up direct public intervention? How can the adverse effects of direct interventions on markets be minimized? What conditions need to be met? What modalities will be most appropriate for specific contexts? What kind of institution building should be envisaged?

Several instruments exist. They were extensively analyzed in a study undertaken last year (Galtier *et al*., 2009) which proposed a typology (Box 1). It is possible to distinguish between public and private instruments and between instruments aiming at minimizing price variability or its consequences. Theoretically, each source of price instability should be treated by a specific instrument. Most of the time, however, it is impossible to apply this recommendation because of the complexity of price formation and the relationships between markets. In reality, various sources of instability generated in several markets are inextricably combined, one reinforcing the other and generating cumulative disequilibriums that spread from one market to another.
In the current study, we will discuss the main controversies related to direct public intervention in markets, first concentrating on theoretical arguments (Section 2) and then comparing theory with reality by analyzing several national experiments used to try to determine the main factors of success and causes of failure (section 3). Finally, the question of what could be done at the international level will be addressed in Section 4.

Box 1. Instruments for Handling Food Price Instability: A Typology

Galtier *et al.* (2009) proposed a framework to describe the different instruments available to handle food price instability. Based on followed objectives and forms of governance, four categories were identified. The objectives sought can be to stabilize prices or manage price risk; forms of governance can be market-based or public.

	Stabilize Prices	Manage Price Risks
Market-based	A-instruments	B-instruments
Public	C-instruments	D-instruments

The central tenet of A-instruments is that the arbitration of market actors causes prices to be homogenized over time, space and between products, which will lower their instability. They include the construction of storage infrastructures, the development of quality standards, and the creation of warehouse receipt systems or exchanges.

Also based on the market, B-instruments are intended to limit the effects of price instability on incomes by enabling economic actors to cover themselves against the risks linked to price variability (futures contracts) and harvests (insurance).

C-instruments aim to stabilize prices by controlling production (input subsidies), regulating imports and exports (variable taxes and subsidies, quotas, bans), and using public stocks.

D-instruments enable household incomes to be supported during periods of high prices (targeted social transfers).

The conclusion of the study is that the strategy based on a combination of A, B and D instruments has not stood the test of time. A-instruments are not enough to solve the chronic price instability problem, which remain unchanged. Private risk management instruments are used very rarely, and safety nets do not successfully prevent the deterioration of vulnerable households' nutritional status. The authors argue for the use of a combination of instruments to fight against agricultural price instability according to its sources.

2 – Price Instability and Market Failures: A Case for State Intervention

The necessity of agricultural market regulation is a long-standing controversy in economics. Over the last fifty years, development prescriptions have shifted from very interventionist, to liberalized market-led policies. None of these policies have been widely successful in promoting food security, and the existence of failures under both approaches is now widely recognized. This consensus will be the starting point for our analysis. A lot of academic studies have analyzed these topics and the experiments undertaken in the last fifty years. This section aims to point out main areas of consensus and main controversies, and try to document them using economic theory.

2.1 Is Direct Public Intervention on Prices Desirable?

The Key Role of Prices: Coordination of Decentralized Decisions

From a theoretical point of view, standard economic theory tells us that no intervention is needed if markets are functioning properly. In this case, private actors concerned with their own interests only are led to act in such a way that the economic system reaches an optimal situation. In particular, private trade and storage will transfer the necessary quantity of products through space and time; prices will be stable and predictable.

The basic market coordination mechanism is price. Market prices signal buyers' willingness to pay a set amount for a good or a service, and potential suppliers are then willing to incur the costs of supply this good or service if these costs are lower than the price. This is how market economies function, and history has proved the superiority of this system over state-led decisions. Markets then have the difficult task of generating prices able to efficiently drive actors' behavior for the satisfaction of consumers. Prices have the key role of coordinating individual decisions conveying the information necessary for efficient decisions. Any surplus or shortage can be eliminated with market clearing at equilibrium price. In economic jargon, the marginal utility of each consumer equates price, so that it would be impossible to increase the welfare of one consumer without depriving another from the same quantity of happiness. Even more, any intervention on prices at this stage is likely to introduce black markets, bribery, and other illegal behaviors, generating unnecessary rents.

The Negative Effect of Price Variation

For the above reasons, some agricultural economists consider that lowering price variation may actually be a cost. Yet, the large price variations that can be seen on actual markets have obvious costs too: when a price goes from 0 to 3 in the space of a few months, it is impossible to conclude that such a change reflects a corresponding change in the marginal cost of production. Now, any discrepancy between the price and the marginal cost means that either the consumer or the producer incurs a loss, while the other side benefits. However, elementary economic theorems show that the winners always benefit less than the losers lose. Thus, in this case, price volatility is not a blessing. Moreover, if actors cannot correctly forecast future prices because of price variability, the basic function of markets—i.e. determining prices equating supply and demand and conveying adequate information to actors so that they can make efficient decisions—is not fulfilled.

Another point to be considered is that the mean price level is not the only determinant in producers' decisions. The risk involved in price variations is also important for producers. When there are large price variations, credit will be more difficult to obtain, impeding modernization and capital accumulation. This is especially important for poor farmers in developing countries: they are poor because, due to a lack of capital, the productivity of their labor is low. If they could borrow, they could increase the quantity of capital in operation, and therefore increase productivity. But banks do not grant loans to poor people subject to large variations in the price of their outputs...

The above considerations, thus, cast a new light on the price variation issue. While small, progressive price changes are obviously desirable, large, sudden swings are detrimental, and do not guarantee an optimal state of the economic system, quite the contrary. Indeed, they stand as a major obstacle to the efficient use of existing resources, lowering production, and, in the long run, increasing the mean price level at the expense of the consumer, without any benefit for the producer. In such a situation, according to the most orthodox economic theory, it is the public authorities' duty to correct excessive and unnecessary price variations in order to let the economic system return to path to long-term equilibrium from which it should have never been diverted. This is the basic justification of the State intervention in agricultural markets.

However, while price intervention for stabilization purposes is justified, it has also to be efficient, that is, curing the evil at its root and avoiding unexpected side effects. To achieve such a target, a careful examination of the causes of price variations is necessary. Without such careful examination, one runs the risk of curing only the symptoms at considerable cost without having a deep and lasting effect. Let us now turn our attention on this issue, which is also the subject of controversy.

The Causes of Agricultural Price Instability

Agricultural markets exhibit very unstable prices. The reason for the high volatility of agricultural prices compared to the prices of manufactured products is a point of agreement among economists: little reaction in demand in response to price variations (called in economic jargon "low elasticity of demand"), high dependence on natural conditions, high transportation and storage costs in relation to the value of the product, and production lags. All these specific characteristics stand as obstacles to smooth market operation, and explain large fluctuations.

The low elasticity of demand means that even large changes in prices will not change the quantities demanded by very much. This is because food is a very basic need. Consumers need a certain amount of calories and proteins. They are willing to give up any other satisfaction to meet this need. At the same time, as soon as the required food objective is met, any other increase in food consumption is deemed futile, thus implying that no consumption increase is to be expected, even for free. For this reason, per capita food demand is relatively constant whatever the price. If price is really too high, a fraction of consumers dies, and some elasticity is added to the demand curve. However, everyone agrees that such a situation is not desirable.[1]

Furthermore, agricultural markets try to match a fluctuating supply, which is fixed in the short term because of the long production lags associated with high storage and transportation costs, with a rigid demand. In these conditions, a small supply shock results in large price changes.

[1] Of course, the above argument should not be taken too literally. Some foods are "elastic," for instance goose liver or champagne. An increase in the price of goose liver would certainly decrease the demand for this commodity by a significant amount. But in such a situation, the demand for goose liver would probably shift to other foods, leaving the total demand for calories unchanged. Indeed, because of substitution, it is possible to observe high values for the demand elasticity of a specific product taken in isolation, but this high elasticity does not imply much flexibility in the overall demand for food.

All economists agree that this is the basic reason for agricultural price volatility. They disagree strongly, however, on the consequences of this phenomenon and weather or not it justifies public intervention in markets. Because demand is generally seen as relatively stable,[2] the question becomes: what causes supply shocks?

Self-Regulation Mechanisms

In theory, private storage and trade activities should solve the problem, allowing the dilution of supply variations through space (market enlargement) and time (storage). But, as explained in Box 2, transfer costs from one market to another, through space or time, define a band that can be wide if transport and storage costs as well as risks are considerable and when prices move independently from one market to the others, separated by space or time. Within the band, domestic price instability is affected neither by trade nor by storage, and domestic policies have no harmful impacts on commercial partners.

The most natural explanation for supply shocks is indeed the subject of a consensus among experts: shocks are a result of nature, which creates different conditions for plant growth. Some are "better," others are "worse" than "normal." For instance, a drought can decrease yields over large areas. An epizooty can kill a large fraction of cattle. Conversely, a small amount of rain at the right time can increase yields by a surprising amount.

It has been claimed that such events carry their own remedies themselves: when supply is low, prices are high, thus maintaining farmer incomes by offsetting the loss of quantity with the increase in price (and conversely in case of "large" production). This constitutes **natural insurance** against price instability and, in this case, public intervention in markets aiming at stabilizing prices will worsen producers' situation by destabilizing income. This might be true in a narrow market, where all producers are subject to similar weather conditions. As soon as markets are widened to allow for natural shock dilution, this is no longer true since a given farmer can very well be subject to natural conditions entirely different from those that trigger the change in price. In addition, while such a mechanism might protect farmers' incomes, it never works for net buyers, which is the status of numerous poor producers in developing countries, and leaves unresolved the situation of consumers, who may suffer from high prices. Thus, this argument should not be invoked to justify blind faith in markets' capacity for self-regulation.

When shocks are the consequence of nature, it is usually possible to rely on the "law of large numbers" to mitigate their consequences. The law of large numbers says that **many independent small shocks cancel out each other**, in such a way that their sum is null. This is the theoretical basis for insurance. Because each contract is "small" in comparison to the total portfolio held by an insurance company, and because the damages on one contract are independent of those on another, the overall outlay of the company is fairly constant, thus allowing costs computations and the definition of contract prices. Of course, the independence of risks is a prerequisite for insurance: companies never contract risks likely to be tied to each other. For instance, drought is rarely insured, because droughts affect not only one farmer (leaving the others untouched), but all farmers in a region. In this case, the reimbursement of all simultaneous accidents would jeopardize the liquidity of the company, and must be avoided. However, even in this case, insurance can be envisaged if the risk of drought is spread over a very large area in such a way that the weather in one sub-area can be seen as independent from the weather in another sub-area.[3]

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[2] Even so, the total demand for food and agricultural products does change, first because the number of consumers and their food habits change, and second, because there is a non-food demand for agricultural products. However, these evolutions are generally progressive and foreseeable.

[3] We have to mention that experiments in developed countries have not been encouraging. When there are no subsidies, demand for insurance by farmers has been very low.

This reasoning is behind the doctrine of the WTO and other organizations that says that liberalization is the best way of stabilizing world agricultural commodity prices: **if supply shocks occur because of weather and other fortuitous events, since such events are not spread over the entire world, and most of the time are independent from one region to another, then merging markets at world level should normally secure a fairly stable overall supply, hence a stable world price.** On this point, all economists agree.

The same line of reasoning also applies over time. Droughts (and more generally, weather events or epizooties) are independent from one year to the next, thus allowing for a pooling of risks over a large number of years. Of course, any step in this direction involves financial considerations, since transactions through time implies lending and borrowing. But with a financial system as developed as it is nowadays, this should not be a problem. "Catbonds," "futures markets" and similar instruments should provide all the necessary facilities for that.

The only difficulty in this case (and the main difference between risk sharing across time and risk sharing across geography) is that physical supply is roughly constant across geography, but not across time. Thus, while financial risk sharing can be efficient in protecting producers' incomes, it does not resolve issue of consumers facing famine... But this problem can be solved with storage. And, in theory at least, private storage should do the job: to make money, the speculator holding an inventory should buy when prices are low (thus pushing up prices when they are "too low") and sell when prices are high (thus pushing down prices when they are "too high").

As explained in Box 2, price stabilization based on these self-regulations mechanisms will be hampered by transfer costs between markets. Because these costs are high for agricultural products, especially in poor countries due to poor infrastructures and high risks, domestic price instability will remain high even if international prices are stable. The fact that prices instability remains high despite market expansion, after more than 30 years of globalization, is therefore explained partly by these costs and partly by an only partial liberalization process as numerous states continue to intervene in agricultural markets.

With this line of reasoning, safety nets are recommended to protect the poorest from huge variations, while others buy insurance. The social implications of such an option should not be underestimated. To some extent, it implies that a large segment of the population of the poorest countries will be marginalized, because of resource access, if they are not able to leave the agricultural sector. In the current international context, opportunities for development outside the agricultural sector are few and far between.

Self-Regulation Failures Related to Expectation Errors

Another explanation for price vagrancy exists, however. It is based on supply dynamics and the difficulties of forecasting in situations of large price fluctuations. Because prices variations are due to either natural shocks, as explained above, or the issuing of a signal that more (or less) supply is necessary to satisfy consumers, it becomes very difficult for actors to decode the information provided by markets. Prices variations are sometimes signals, reflecting changes in fundamentals and requiring supply adjustments but sometimes they are the result of accidents requiring no changes in supply. This problem holds true for both farmers and traders. It occurs on domestic markets and on the international market. In this way, markets do not fulfill their role of providing the appropriate information to actors, leading to coordination failures.

Box 2. Price Transmission Between Markets

The law of one price stipulates that in a perfect world, without transport costs and officials barriers to trade (such as tariffs), identical goods will sell everywhere for the same price if they are expressed in the same currency as a direct result of the profitability of buying a product at a low price on one market to sell it at a higher price on a different market. In reality, transfer costs from one market to another are high for agricultural products. This includes transportation costs and all transaction costs—that is, all costs related to negotiations and contract searching costs, risk-induced costs, and the costs incurred by meeting the licensing or other requirements of rent-seeking government agencies or officials. Market liberalization policies aim at reducing this last kind of cost. But other types of costs remain. They constitute a protection, especially important for landlocked countries, but also for all cases where risk is high. They act exactly as a tariff, making prices in the country higher and then increasing supply and lowering demand, decreasing trade compared to a situation without transfer costs. Overvaluation of the exchange rate also acts in exactly the same way.

Transfer costs determine a price band within which trade is not profitable and domestic prices are not stabilized by the international market. For example if the price is 100 on the international market and transfer costs are 50%, it will not be profitable to import (export) before the price on the domestic market reaches 150 (66). Within the band, which can be wide especially when transport facilities are poor and risks high as is often the case in LDCs, domestic price instability is not affected by trade providing space for domestic policies to deal with this harmful phenomenon without destabilizing external markets.

Domestic markets are connected to the international market when the domestic price equals the upper or lower limit of the band. Then, international price fluctuations will be transmitted to the domestic markets, in proportion to the exchange rate, while the volume of exports or imports will affect the world supply and demand balanced by the international market. If the country has an important share of world trade, this variation may affect the world price. This is not the case for small countries.

It is by this price transmission mechanism that the market is enlarged by trade, with the price equating world supply and world demand and allowing for the dilution of small independent local accidents. The same mechanism is at work when import prices rise, increasing domestic prices when the country is importing or exporting, at the expense of domestic consumers. It is impossible to obtain prices stabilization through international trade without accepting to share the burden of adjustment and thus tolerate some import price volatility. But, as explained above, instability will be removed only if it is generated by shocks related to natural events and resulting in prices exceeding the band. One positive aspect of this phenomenon is that, within the band, a public stockpiling scheme may stabilize domestic prices (let us say between 80 and 120, to continue with the example above) without destabilizing external markets.

The same mechanism applies over time according to storage activities. Transfer costs from one period (which include storage costs but again also risk and other transaction costs) to the next determine a band where private activities aiming at transferring the product supply from one period to another is not profitable and where prices fluctuate independently.

Some instruments aim to minimize transfer costs between markets through space and time, thus minimizing the band where prices fluctuate independently (A-instruments). Decreasing storage and transportation costs will indeed improve the market functioning and decrease price instability. Lowering risk-related costs is, unfortunately, much more difficult.

Price transmission is not limited to vertical linkages. The fundamental role of exchange rates was mentioned above. The importance of the costs of transfer from one market to another indicates a first link with energy markets. Energy markets also determine input prices and therefore production costs. Moreover, the recent development of biofuels creates new strong links between energy and agricultural products. Agricultural product markets are also linked together through to major channels: (i) consumers' choices and arbitrations between products according to relative prices that create a strong link between product prices, with the substitution effect transmitting price variations from one product to another, and (ii) the competition for land and other scarce production factors necessary to agricultural production that generates contagion phenomena.

When deciding what and how to produce in what quantity, the producer never knows what the price will be at harvest time. Actually, any economic calculations at planting time have to be made on the basis of "expected" (not "equilibrium") output prices. In case of a discrepancy between the expected price and the real price, the producer may either earn an unjustified reward or receive a dramatic punishment. Bad forecasts generate inefficient decisions; supply will be too high or too low to meet consumers' needs, generating huge prices variations.

Another complication comes from the necessity of funding investments (long-term investments such as building a stable, and short-term investments such as buying seeds or fertilizers, with the latter applying in particular in the case of poor peasants, even when they do not trade on markets: in shortage situations, they sometime eat the grain normally reserved to make seed, thus pushing famine back to the following year). If incomes were low last year, money to fund investments this year will be lacking, thus decreasing supply.

In this case, the problem arises because of expectation errors: if, at a certain time, all producers expect a "high" price, they will probably all increase production, often going into debt to do so. It might happen that the overall increase in production goes beyond consumers' capacity to buy. Prices then collapse. As a consequence, the next year, farmers see price as being "low," which does not encourage them to invest again, especially as their incomes had dropped, they have to repay their previous loans, and they are short of money. As a result, production is low, prices soar, and so on... This mechanism is called a "cobweb" because the diagram used to illustrate it for on a basic supply and demand scheme actually resembles a cobweb.

The same mechanism affects storage decisions, hampering market operation: too often, speculators drive prices even higher in the case of shortages, and even lower in the case of gluts. This is because they are wrong: they expect prices to rise or fall even more (see Box 3). In these cases, fluctuations are generated by expectation errors due to imperfect information and the major influence of expectations on the commodity price formation process (Mandelbrot, 1973). As already emphasized, this happens on domestic markets as well as on international markets.

Box 3. The Controversial Role of Speculation

International markets for agricultural products are often coupled with futures markets, which allow the exchange of the risk associated with price fluctuations with a premium through forward contracts. They offer a way to manage price instability. However, transaction costs (especially for small farmers in poor countries) are high and they are better suited to traders than to farmers. Speculators are key actors on the markets because they are willing to bear the risks other actors like to avoid. When the markets are running smoothly, speculation stabilizes prices, diluting shocks in space and time exactly in the same way that trade and storage do. Because speculation is at the heart of fervid discussions, it is interesting to refer first to its definition. Derived from the Latin word *speculor* (to observe), to speculate is to buy or sell in the hope or deriving monetary gain. Useful arbitrations in space and time by merchants belong to this category. They stabilize the prices when markets are functioning well and expectations are accurate, and destabilized it when herd behavior, panics, crashes, and other destabilizing behaviors take place on the market. The heart of the question is still the same: expectations and their accuracy, the fact that they may completely change in a few seconds, and the key role they have in the price formation. The financiarization of the commodity, which is the fact that investors, in their search of uncorrelated assets, recently entered agricultural markets, may magnify the risk of destabilizing behaviors.

Many types of cobwebs have been described in economic literature. But all of them share the fact that they **are not curable by the same recipes** that work for shocks generated by natural events. For instance, while two isolated markets fluctuate in "anti-phase" (high prices in one market correspond to low prices in the other), merging them will just result in phase "synchronization."

Insurance schemes are not feasible, first because prices are the same for everybody at the same time, thus precluding any geographical risk sharing, but also because there is an almost perfect autocorrelation between two adjacent periods, ruling out any sound financial risk sharing across time.

In presence of this category of shocks, **the market itself is at the origin of fluctuations**. If one wants to avoid these fluctuations, the only possibility is to intervene directly to regulate market operation. The idea is not at all to suppress the market, just to help it play its role of informing producers of consumers' wants and consumers of production difficulty. Various possibilities exist for that, and will be described below. Yet, a very general rule must be pointed out: it consists in creating the conditions so that a minimal supply can occur. If a minimal supply is "sure," then prices cannot soar up to a very high level. And because prices cannot be too high, they also cannot be too low because producers are never encouraged to overproduce. The practical enforcement of this rule depends upon circumstances, especially the scale of the production basins over which it is applied and the capacity of governments to manage imports and exports, as will be seen below.

Coordination Failures Justify Direct Public Intervention in Markets

In other words, while liberal recipes stand as the best solution to get rid of shocks from nature, there are other sources of fluctuations that are best cured by State intervention. Unfortunately, in practice, both sources of fluctuations are at work: harvest sizes are affected by the weather, and actors expectations are not always fulfilled. The difficulties involved in accurately assessing the causes of a given price variation is perfectly illustrated by the ex-post analysis of the 2006-2008 price surge (Box 4). As seen above, the problem is that the appropriate remedies are completely different in each case, but the sources of large fluctuations are inextricably intertwined. To cure the first kind of shocks (caused by nature), measures aiming at improving the market operation by providing a better environment for private storage and trade activities and lowering transfer costs through improved information and transparency on markets (A-instruments) are well suited. Insurance could resolve the problem for the remaining instabilities of this kind due to transfer costs (B-instruments). But, for the second kind of instability, generated by the market itself in an uncertain world, direct public intervention in markets is necessary. The importance of agriculture, both as the provider of basic food and as the main source of income for the large majority of the poor, makes ex-post instruments such as safety nets (D-instruments) impossible to use. Beyond issue of human dignity, the governments of poor countries do not have access to the necessary financial resources. It is also worth considering that if safety nets are necessary in cases of extreme events; their use will be far less costly if direct public interventions on markets minimize the probability of occurrence of such events.

Moreover, these instruments have the same implementation difficulties as direct public intervention (rent-seeking and so on). This is what makes setting up a sound agricultural and food policy is so difficult.

The controversy turns around the relative importance of the two kinds of instability described above. For some, the instability related to the difficulty of self-regulation in agricultural markets is negligible and, because of the inter-relationships between markets, it is better not to intervene so as to not to transmit price instability to other markets. Compensation, outside the market, could be used, if necessary, for the poorest while others will take out insurance. Coordination failures do not take place. For others, despite the difficulties and costs associated with public interventions, building a conducive environment for private activities is necessary but unlikely to be enough, at least in the medium term. Public intervention is required.

Price Instability, Dynamics Involved, and the Poverty Trap

Food markets often exhibit very unstable prices. **Does this mean that they are unpredictable?** If not, the worst impacts are concentrated on poor consumers, who often spend more than half of their budget on food, which can be compensated for, avoiding at the same time social unrest and economic instability. Instruments that aim to compensate the poorest, such as safety nets (D-instruments), could be used. **If so, they lead to inefficient behaviors by actors.** For producers, as explained above, risk discourages investments and even market participation for the poorest. It may explain why some economies seem stuck in a low equilibrium trap (Dorward *et al.*, 2004; Poulton *et al.*, 2006; Timmer, 2000). **Then, in certain circumstances, and at least at a specific stage of development, market-related public policies can be necessary to escape from vicious circle of low labor productivity leading to low incomes and low investments.**

Impacts are also considerable in developed economies as the business is too risky to allow efficient investment decisions. Periods of low prices, generating farm bankruptcies, especially among indebted farmers, are followed by periods of high prices due to scarcity. Even if the impacts on consumers are lower because consumers are richer and consuming highly processed goods in which raw material costs account for a small share of the final price, the general impacts on the economy are not negligible.

The problem of economic policies is not only—and not even primarily—to allocate a fixed supply between consumers but to create conditions such, in the long run, allow supply be large enough to smoothly match at least the basic needs of the population. At the same time, this target must be hit with an efficient use of existing resources, without squandering them in over-supply. The question, then, is whether a completely free market and large price fluctuations can help reach this target.

In presence of large price variations, capital is often wasted. This is because when prices are high, producers tend to overinvest. When prices fall afterward, they cut production, and part of the investment is left unused (hence, squandered). Most of the time, when prices rise again, the unused share of capital is not usable anymore (or only usable at high cost), so new capital must be invested again...Obviously, this is not an efficient process.

These are very strong cases for price regulation indeed, even assuming “risk neutrality.” But the detrimental effects of risks also have to be considered. When planning production on the basis of expected prices, a farmer (or the farmer’s banker) cannot ignore the fact that expectations might not be met: this puts constraints, including precaution, on decisions, and advocates for a prudent use of existing resources, especially credit. In this way, many development opportunities are missed, and the poorer the farmers are the more opportunities are missed: the poor are, in general, more “risk averse” than the rich. This may explain (along with the lack of capital) most of the “backwardness” often negatively attributed to traditional peasants. In any case, risk considerations in general prevent resources from being fully utilized.

This is the basic rational for price stabilization policies. Far from negating the virtues of a liberal economy, they should be designed to increase the quality of the messages carried by prices in order to inform producers of consumers’ desires, and inform consumers of the difficulty in producing.

Finally, every one agrees on the fact that private activities such as storage and trade are necessary, and that the provision of public goods in the form of infrastructures is essential to allow markets to function as well as possible. **The controversy is whether or not it is enough to avoid coordination failures**. Empirical evidence all over the world seem to prove it is not (Dorward *et al.,* 2007), but some argue that this is due to a partial liberalization process that discourages private activities (Kerralah *et al.*, 2002; Jayne *et al.,* 2002).

When referring to the coordination failure associated with price instability, it is impossible to manage this type of failure through ex-post instruments aiming at compensating the losers because coordination problems affect the whole system. Food prices are indeed key variables, determining wages and inflation in less developed countries, as well as social peace and political stability. The risk is therefore systemic, and the option of ex-post compensations, as a safety net, becomes too expensive.

All these considerations explain why a purely economic approach may lead to the conclusion that large and sudden price variations are not efficient and should be avoided as much as possible. It does not mean that price signals must be neglected: obviously, techniques and preferences vary over time and relative prices must vary to indicate these changes to producers and consumers.

However, these evolutions are generally smooth, and take a long time to become significant, thus leaving ample room for progressive adaptation. For instance, the long-term trend of dropping agricultural prices (something between 1% to 5% per year) reflects technical progress for the benefit of consumers. But it is not the kind of price variation facing most farmers, especially in poor countries. Most commonly, a given agricultural price goes from 1 to 2 and then to 0.5 in the space of three years. What message does this send to producers? How can they interpret it?

Which Level for Action?

When public interventions should be envisaged, one has to decide at which level. Should it be a task for an international authority, a local community, a government, or a group of regional governments?

As pointed out in Boxes 2 and 4, there are no (or very few) completely independent markets, whether geographically or over time. Any decision taken at any level at any time is likely to impact other entities, at the same instant and at another time. For instance, during the 2007-2008 crisis, some governments decided to cut rice exports in order to maintain domestic prices at reasonable levels as far as possible. They undoubtedly increased the world-wide penury, which let prices soar to incredible levels. They were severely condemned by the world public opinion for doing so. At the same time, they not only protected their own citizens as consumers, but they also avoided too much enthusiasm among their producers for increasing production next year. And that was sound, given the fact that the price of rice decreased by a large amount the following year. Indeed, because they were large operators, by doing so, they helped stabilize prices in the year after the peak.

Box 4. Ex-Post Analysis of the Causes of the 2008 Price Spike

Over the period 2007-2008, most international agricultural prices doubled or even trippled. Milk was the first product to be affected, with the quick increase taking place during the spring of 2007, followed later in 2007 by spikes in wheat and maize prices. The price of rice, the last commodity to be affected, skyrocketed in a very short period during the first half of 2008. Almost all agricultural food products were affected with the exception of sugar. Tropical products and meat fared better than grains. A few months later, prices began to drop. The sudden rise in prices and the sharp drop a few months latter were unexpected. At the time, neither economic models nor international institutions predicted the price spike; experts were mainly concerned about the long term downward trend in agricultural prices.

Several studies have analyzed ex-post the possible causes of the food price spike. The main causes that have been identified are: (i) rapid economic growth in certain developing countries such as China and India which, together with higher incomes, led to a nutritional transition and increased demand for grains; (ii) adverse weather conditions in certain key production regions such as Australia and eastern Europe; (iii) a weak US dollar; (iv) high oil prices leading to higher production costs for agricultural products; (v) biofuel production; and (vi) speculative behavior (see, among others, Abbott *et al.*, 2008, 2009; Von Braun J., 2007). There is a widely shared opinion that these different causes act together and that it is difficult to evaluate the impact of each one individually. Using the Aglink model, Dewbre *et al*. (2008) found each of these factors to be equally

important. The resulting impact, when all shocks are combined, is much lower than the price increase that was seen, underlining the fact that other mechanisms may have been neglected in the analysis.

Some Causes Are Controversial

Headey and Fan (2008) argue that neither the argument involving growth in middle-income countries—China and India do not show trade deficits for agricultural products over the period—nor the weather shock argument—the fall in output in several countries in 2007 was offset by increased production in other countries (Argentina, Kazakhstan, Russia, United States) and ultimately world grain production declined by 1.3% in 2006 but increased by 4.7% in 2007—are convincing.

Several studies have focused on the biofuel explanation. As underlined by Keyzer *et al.* (2008), it is clear that in the context of a scarcity of fossils fuels, biofuel production increases competition for land, fertilizer and labor. Moreover, the policy adopted results in high production subsidies for biofuels, and generates a completely rigid demand that bears a significant share of the responsibility for the food crisis. Some experts stressed the fact that, while the explanation is convincing for maize, it is less persuasive for wheat and rice (Headey and Fan, 2008). But Mitchell (2008) explains how the substitution effect induced by land competition for crops not directly concerned by the demand for biofuels may generate contagion phenomena.

Another controversial issue is the role of speculation in the process. In the press, financial speculation has often been accused of being responsible for the price spike. It is true that increased financial activity took place at the time of the price rise but the causal link is not at all clear. One must remember that higher volatility necessarily induces speculation because of speculators' function in markets (bearing risks). Consequently, as underlined by Headey and Fan (2008), speculation may be a symptom more than a cause of price volatility, *"l'écume sur la vague"* (the foam on the wave) (Chalmin, 2008). Despite several studies, it is difficult to assess precisely the role of speculation in the phenomenon, underlying the difficulties in economics of discriminating between alternative processes. As underlined by Gilbert (2008), uninformed speculation may be destabilizing and generate explosive price behavior. A new class of actors has entered commodity markets through index-based investment, viewing commodities as an asset comparable to others. The money involved may be substantial. However it is difficult to evaluate its influence on the price boom.

Finally explanations focusing exclusively on fundamental factors leave an important share of the price hike unexplained. Moreover, the rapid rise in prices followed by the quick fall some months later suggests a bubble phenomenon. Piesse and Thirtle (2009) explained the rice price increase by panic leading to export bans from major exporters, and underline that such behavior is costly for the world community.

On the other hand, Boussard, Gérard and Piketty (2008) show a model that, in 2005, predicted the phenomenon fairly well from purely endogenous relations and market mechanisms, without requiring any other assumptions such as drought, biofuels, changes in consumption, or speculation. It has been said that their model was a good predictor only by chance, just as a stopped clock indicates the right time twice a day. Yet, this model at least does not contradict the "endogenous hypothesis." In addition, similar results have been found with another model (Munier, 2010).

This observation leads to the conclusion that a world authority should be in charge of the problem. Yet, there are objections. The most important is that it will be very difficult to determine the proper international prices or bands of prices. Whatever steps are taken to stabilize markets, they will generate instant private rents or preclude private gains. Moreover, as seen above, international price stabilization will not affect a large share of domestic price instability, the portion that takes place within the band defined by transfer costs from one market to another. Because most poor consumers face very high transaction and transport costs, large price fluctuations will remain in poor countries stucking them in the poverty trap. Furthermore, local communities do not have the logistical and financial capacity to regulate markets. For these reasons, the practical level for action is national governments or groups of governments. However some supports of the international community are needed. It will be addressed in the fourth section.

At present, national governments are largely deprived of power because of the multiple international agreements in force. In particular, the WTO ban on most technical measures to stabilize domestic markets is a serious impediment in this regard. The WTO agreements should therefore be revised to allow governments to define the agricultural policies necessary to improve food security. In this respect, one must emphasize the fact that, according to jurists, the Marrakech treaty provides almost all the necessary provisions to allow government intervention if it is deemed necessary, so that a formal renegotiation of the treaty would probably not be necessary. Only a strong reversal in how it is enforced should be envisaged.

2.2 Is Price Stabilization Feasible?

While direct public intervention in agricultural markets seems necessary under certain circumstances, the success of such intervention is, however, dependent on political and institutional conditions. Inadequate or untimely public interventions discourage private activities in commercialization (eviction effect) and generally decrease efficiency. Sometimes, they even increase uncertainty (Jayne *et al.*, 2006). It has been demonstrated that, in a context of price jumps, public intervention aimed at containing the leap could indeed worsen it, because of a lack of predictability (Chapoto and Jayne, 2009; Nijhoff *et al*., 2002; Mwanaumo *et al*., 2005). The private sector cannot operate in an environment where governments intervene in a discretionary and unpredictable way making prices even less stable (Byerlee *et al.*, 2006). State intervention is in this case seen as lowering efficiency by limiting local competition and private sector development. State interventions also generate rent-seeking behaviors and are the sources of maneuvers expected to serve the interests of specific actors. Thus, political economy consideration of existing contradictory interests is necessary to understand food price policy designs and implementation as well as the difficulty of reforming agricultural markets (Jayne *et al.*, 2002).

These analyses, applied to price stabilization policies, are consistent with more general analyses of the forms of governance that prevail in policy elaboration and implementation. They insist on the capacity of diverse stakeholders (governments, lobby groups, etc.) to meet their objectives. At the World Bank, Kaufman considers that society engagement and state performance form the two pillars of good governance (Kaufman *et al*., 2005; World Bank, 2005). His works led to the definition of six governance indicators that measure "government capacity to formulate and implement policies in an efficient way" and the "respect of citizens and [the] state for the institutions that govern their social and economical interactions."

Somewhat summarized, these works suggest that the processes through which food price stabilization policies are elaborated and implemented can count as much that the content of these policies (how things are done counts as much, and maybe even more, that which things are done), and that, as a result, we have to analyze the forms of governance that drive policy elaboration and implementation. How is food price stabilization elaborated? What are the specific interests served by these policies? Which stakeholders participate (or not) in policy elaboration processes? How are food price stabilization policies implemented? Are these policies predictable enough? Are they effectively enforced by the State and respected by private actors? Among the many institutional factors that influence the ability of policies to smooth price volatility, three can be distinguished: policy effectiveness, policy predictability, and policy appropriateness to a plurality of interests.

Policy Effectiveness

Policy effectiveness is related both to the financial capacity of States to implement policies and to States' capacity to control policy enforcement and compliance (dissuasion and punishment of policy-circumventing strategies).

Policy Predictability

Policy predictability is linked to the State's capacity to elaborate and implement policies in a transparent way, so that private actors can correctly anticipate government actions and position themselves on food markets.

Policy Appropriateness to a Plurality of Interests

Policy appropriateness to a plurality of interests is related both to the capacity of private actors to define and represent their interests and to the capacity of the State to take into account these interests (pluralist system of interest representation, control of corruption and rent-seeking behaviors, arenas for discussion and negotiation, enhancement of capacity-building programs among different stakeholders, etc.).

In short, state interventions should be based on collaboration between public and private actions. They should be rules-based and relatively predictable, as well as credible, which implies sure and flexible access to financial resources and expertise. To be legitimate, intervention has to be the result of actors' discussions and negotiations, which in turn means that institution-building for organizations such as farmers' organization may be a necessary prerequisite. Rent-seeking behavior should be avoided as much as possible through transparency, the existence of press/media freedom, and exemplary punishment of adverse behaviors.

These institutional factors are likely to express themselves differently according to the level in question, given that prevailing stakeholders are different. In the next section, we will illustrate how these factors influence policies' ability to reduce food price volatility at the national level. At the regional and international levels, the prevailing stakeholders are different from those that are most influent at the national level. As a result, governance issues tend to differ a lot.

If we want to analyze the processes of elaborating and implementing food price stabilization, we need to consider a wide variety of stakeholders. For example, at the international level, States, traders, experts and non-governmental organizations influence these processes and should be taken into account. Considering States, we need to consider a great variety of stakeholders as well. In broad outline, we can distinguish between: "high income states" that tend to support agricultural revenues (farm problem, producer-side) and "low income states" that are more likely to defend food security (food problem, consumer-side); and between "importing" and "exporting" states; and between "small" and "large" states when it comes to international trade, etc. Policy effectiveness, predictability and appropriateness to a plurality of interests have much to do with the forms of coordination that prevail on the international level. Crucial governance issues arise. If one decides to regulate food prices at the international level through policies, should forms of coordination rely exclusively on intergovernmental agreements? How can one ensure policies' long term financing, enforcement, transparency, and capacity to serve the general interest? Nowadays, there is no relevant international organization to ensure these four conditions (they are not covered by the mandates of either the World Trade Organization or the Food Agriculture Organization). Proposals have been made on setting up a new organization, the International Food Safety Agency, but many questions remain as to how to ensure this new organization's effectiveness.

Theoretical Aspects: A Few Concluding Remarks

Finally, a consensus exists as to the difficulties and costs associated with state interventions in agricultural markets. The subject of controversy is the consequences of these difficulties and costs, and the way forward. For some experts, all of these considerations, added to the facts that high transaction costs hamper market operation and that public budgets are scarce, point to the argument that it will be more useful to invest in public infrastructures (roads, health, education) and in agricultural research and extension than in food price stabilization (Cumming *et al.*, 2006). While some agree that direct public interventions may be useful because of the harmful effects of price instability, they argue that direct public intervention is associated with so many adverse effects that the cure is worse than the disease.

For others, coordination failures justify intervention, especially in LDC countries because of the dynamic gains to be expected in economies stuck in the poverty trap. Building a conducive environment for private activities is necessary but unlikely to be enough. In this case, direct public intervention in market is required.

3 – From Theory to Practice: Lessons from National Price Stabilization Experiences

One of the main reasons for State withdrawal from agricultural markets in the mid-1980s was the poor efficiency and high cost of public intervention. As a result, it is useful to consider past and current experiences with price stabilization policies and derive lessons from them. A precise analysis of past experiences may indeed help define public interventions that maximize positive impacts and minimize adverse effects. This is the main objective of this section.

Fourteen case studies on price stabilization policies[4] in a wide range of (geographical, socio-economic, and political) contexts and periods have been analyzed in order to identify key factors of success and the reasons for failures. Then, some recommendations are formulated for the proper implementation of price stabilization policies and for further research on new possible areas for public policy.

3.1. A Wide Variety of Contexts and Objectives but Few Combinations of Policy Measures

Over the past decades, price stabilization policies have been implemented in numerous countries and in widely different national contexts and periods. However, developing countries generally experienced the same historical trend in public policies: (i) strong public interventions until the mid-1980s, (ii) state withdrawal and priority given to the market until the end of the 1990s, and finally (iii) a return to public intervention in recent years. This evolution is in line with recommendations by international institutions, at least for the two first periods. It therefore underlines the importance of these institutions.

The direct objectives pursued by interventions are diverse and highly dependent on the economic and social profile of each country. Low Income Countries tend to fight against the "poverty trap" and/or to protect consumers from soaring prices (i.e. Madagascar, Mali, Zambia, Kenya, and Malawi). Most Middle Income Countries seek to maintain low consumer prices in order to fight against urban poverty and promote the industrialization process, taking advantage of the improvement in competitiveness allowed by low wages (e.g. Thailand, or Indonesia). They also try to encourage agricultural production and a higher level of food independence through the incentive of relatively high producer prices (i.e. India and Indonesia). The objective can also be to protect the most vulnerable and malnourished people while specifically supporting smallholder farming (e.g. Brazil). Finally, High Income Countries seek to protect their agriculture from external shocks in global markets in order to maintain their food independence, protect employment (e.g. the United States, the European Union, and Canada) and more generally aim to promote multi-functional farming (i.e. the European Union).

Domestic food price volatility in these countries can have different causes. Climatic factors affecting national production (for example, periods of drought in African countries can lead to large drops in national cereal production) tend to call for public interventions aiming at improving the operation of the domestic market (e.g. information systems, discussion, rural infrastructures, standardization, etc.), and opening borders. Endogenous instability due to anticipation errors by players may call for other policies aiming at directly acting on marketed volumes in relation to demand and thus

[4] See the list of countries, products and periods under analysis in Appendix 1.

controlling boarders. International food price volatility may also lead countries to implement trade regulation measures, when small "price taker" countries are affected by price variations in international markets. In the fourteen cases studies we led, it is difficult to determine the relative weight of these different sources of domestic food price volatility: it is most likely that they both played a role. This partly explains why different kinds of interventions have been implemented.

Beyond the diversity of national experiences, broad characteristics in the content of implemented policies can be underlined.

Policies combine various instruments. This means that instruments are never implemented in isolation, but are always part of a package[5] (policy mix). The table in Appendix 2 presents the wide range of instruments implemented and how they are combined in most of the fourteen cases studies. Following the typology of the ECART study (see Box 1 and Galtier et al., 2009), they consist primarily of "C" instruments (that is, instruments aiming at minimizing price instability through public intervention).

In particular, two main policy mixes are used in most of the cases under analysis:

- (I) trade regulation through quantitative restrictions + production support (input subsidies, farm credit, agricultural extension, etc.) + buffer stock used to define a price band (India, Indonesia, Malawi, Thailand, and Zambia); and
- (II) trade regulation (through tariffs or quantitative restrictions) + production support (Mali, Guinea).

These two kinds of combinations of instruments aim at balancing supply and demand. When prices are considered to be too high, an increase in supply on the domestic market is obtained by encouraging production or imports and limiting exports, as well as by releasing public stocks if available. When prices are considered to be too low, supply reductions can be achieved by (i) limiting imports and production through set asides or price level adjustments relative to inputs costs; and (ii) limiting producers' deliveries to the market (facilitating storage by producers).

Decreases in supply can be combined with increases in demand (public stocking, facilitating private stocking of products). In this case, "C" instruments are generally combined with "A" instruments (that is, instruments aiming to stabilize prices through private interventions), leading to a combination of public and private actions. In such a context, buffer stocks enable the government to directly increase or decrease the quantities available on the domestic market. Countries that do not use buffer stocks are generally engaged in structural adjustment programs (e.g. Mali in recent years) or have weak institutional and administrative capacities (e.g. Guinea).

Some countries use also "D" instruments to act on the demand side, particularly in case of food crises. This is the case of India where consumption subsidies directly focused on the target population in order to resolve the potential conflict between consumers' and producers' interests.

In Brazil, programs benefiting both specific groups of producers and specific groups of consumers (Agriculture's Food Acquisition Program, PAA) have been implemented. Some products from smallholder farms are purchased at a subsidized price and distributed to vulnerable groups of consumers.

[5] See Appendix 1 for information on the combination of instruments used in each country under analysis.

Burkina-Faso mainly used "A" instrument through its "Price Smoothing Fund" combined with "C" instrument (input subsidies).
Concrete implementation modalities vary widely across countries (Box 5).

Box 5. Diversity in Price Stabilization Policy Design and Implementation

Indonesia sets a price band associated with external trade restrictions through the Bulog. The producer price and the input price/producer price ratio are used to monitor the production trend and mitigate the problem of excessive producer incentives and accompanying costs. The width of the price band was also seen as a key parameter. It was progressively widened with the development of private trading activities, in order to avoid eviction effects. Bulog procurement generally concerned only a small volume (around 10%) of marketed rice production. Rice prices were maintained near the level of international prices during the period 1970-1997. Government intervention proved to be highly reactive to the changing context during that period. Strong efforts have been made to significantly strengthen the logistical capacity and managerial procedures of the Bulog. Extensive analytical studies on key parameters (size of margins between floor and ceiling prices, size of buffer stocks needed, etc.) have been conducted.
By contrast, after the economic crisis in 1997-1999, producer prices were kept 30% higher than international prices in spite of the negative effects on the poorest and the absence of additional reserves of productivity.

In **Burkina Faso**, since 2006, the guaranteed producer price in the cotton commodity chain has been connected to the international price. However, with rising fertilizer costs, food inflation, and dropping international cotton prices, the real floor price for producers is not high enough to ensure sufficient earnings and encourage production, in spite of producer price smoothing. Consequently, producers are replacing cotton with maize in crop systems.

In **Guinea**, the "Fédération des Paysans du Fouta Djallon" (the Fouta Djallon farmers' federation) organizes the negotiation of the producer floor price between producers' groups and traders at the start of each agricultural campaign. Technical elements are considered during the negotiations such as production costs and inflation. The floor producer price varies from one year to the next, but all producers know the price in advance (predictability).

In **Zambia**, guaranteed producer prices through public purchases are higher than the current prices on wholesale markets, providing strong incentives for producers.

In **Thailand** and **India**, because of lobbying pressure, the guaranteed producer price is too high, disconnected from the international price, and generates excess supply. The growth rate in maize production was lower during the liberalization phase (1991-2004) than during the periods of heavy government intervention in 1964-1990 and 2005-2010. Real prices for consumers tend to have fluctuated more during the liberalization periods than the do nowadays.

On the contrary, in **Malawi**, due to escalating costs (massive stocks accumulated in state warehouses or exported at a loss) and financial constraints in the 1980s, the Agricultural Development and Marketing Corporation (ADMARC) was often unable to defend the minimum support price for maize (as well as the ceiling price in the 2001-2002 crisis). The price band was annually revised and moved closer to international parity prices. Support producer prices were reduced or withdrawn in many areas, and this lead to development of parallel and illegal markets. Such a process also occurred in the 1970s in Madagascar and Mali, leading to a stagnation of production levels and an increase in imports.

In India in the 1970s, there was no difference between the guaranteed producer price for food sale operations to vulnerable groups through public storage (tool targeting consumers) and the support price for production (tool targeting producers). With the continuously rising support price (disconnected from international trends) and excessive public purchases, such confusion in targeting the population and pricing policies had negative effects on the food inflation rate.

3.2. Factors of Success or Failure

Case studies show a number of successes in terms of production levels, price stabilization, yields, consumer protection, and independency from the world market. Indonesia, for instance, shifted from the world largest importer of rice in the 1970s to a self-sufficient country in the mid 1980s.

A virtuous circle sometimes appears in poor countries stuck in the poverty trap, where the risks involved in production activities results in a strong supply response. Labor productivity and agricultural incomes tend to improve, provided that there are productivity reserves. Reserves of productivity may come from technological innovations such as the green revolution (improved seeds, high yield varieties) or from an increase in capital (public capital, like irrigation facilities or private capital bought by farmers through investment). See Box 6. While more capital often implies that less labor is used, the rising incomes associated to this increase in capital implies higher demand for non-agricultural goods and services as well, which offers employment opportunities in non-agricultural sectors. When the product under stabilization is an important part of consumers' diets, the price of food tends to fall, but producers' incomes do not drop because larger amounts of products are sold. The food policy dilemma is thus solved.

However, a large number of factors are at stake, and instruments are combined, which means that the observed positive social and economic changes cannot be attributed to price stabilization policies alone. Moreover, some measures have had negative unintended consequences that call into question the sustainability of the policies involved: increasing costs, inefficiency of state activities, eviction effects on private operators, large-scale corruption (see Box 8).

Box 6. The Key Impacts of Productivity Improvement

In countries such as Indonesia, India, Zambia, Kenya and Malawi, the green revolution made new gains in productivity possible: improved seeds and high yield varieties of wheat, rice and maize. In **Indonesia**, new technology was available to allow labor productivity growth, and the stabilization of rice prices was one component of rice modernization. The other components were: a technical package (distribution of high yield varieties, provision of fertilizers and pesticides at a highly subsidized price), rural infrastructures (irrigation systems, roads, schools, market places, communication systems, electrification, public health facilities), extension services, education, etc. In **Malawi**, positive trends in maize production and yields in the 1983-1993 period can be explained by the implementation of a package of public policies including breeding programs, investment in agronomic research, extension, seed distribution systems, rural infrastructures, ADMARC's interventions, and fertilizer and credit delivery. Since 2005, the dramatic increase in maize production is also partly due to the dissemination of a technical package through the Agricultural Input Subsidy Program (vouchers for buying inputs at a subsidized price).

In a context of state withdrawal such as in **Guinea**, support production actions combined with seasonal prohibitions on potatoes imports have been implemented by farmers themselves, organized within the Fédération des Paysans du Fouta Djallon. The Federation has developed numerous services for its members: providing certified seeds and fertilizers at acceptable interest rates, extension, management advice, hydro-agricultural infrastructures, storage capacities, rural roads, etc.

It must be stressed that implementing these "green revolution" techniques requires large quantities of capital (improved seeds, fertilizers, and waterworks). It would not have been possible for peasants to get access to such inputs without credit, and access to credit would not have been possible without a minimum of output price stability. One might notice, however, that repeated access to credit also depends on harvest risks and input costs. Producer price policies have to take into account input costs if they want to maintain producers' revenues and their capacity to access credit. This is why policies combining output prices and input costs are particularly interesting.

Several types of factors of success or failure for price stabilization policies can be identified and classified in two broad categories: (i) technical-economic factors, and (ii) political-institutional factors: policy effectiveness and predictability, consultation and negotiation among actors, problems related to rent seeking and corruption. They will each be addressed in turn.

3.2.1 Technical and Economic Factors

The appropriate choice and calibration of instruments are critical in the success or failure of market regulation. This appears to be a very complex task that requires precise technical expertise. Case studies reveal four key points: (i) the level of the floor and ceiling prices, (ii) the impacts of initial endowment in factors, (iii) storage and financial capacities, and (iv) costs and management of over-supply.

Floor and Ceiling Price Levels

The level of the floor price (in relation to input costs) will encourage or discourage production. It has to be adjusted according to the context of the country. Poor importing countries will encourage production, especially if the product is a staple food. In theory, the band has to follow international trends (see Box 5) but, in the case of low international prices and very poor countries where most of the population is engaged in agriculture, it would be worth considering initially maintaining prices at a higher level.[6] For many agricultural producers who are net buyers in developing countries, the issue is to both keep food prices low for consumers and maintain food prices at an encouraging level for producers (adjusted to production costs). In these situations, fertilizer subsidies could be an interesting option: they can make it possible to maintain an encouraging price for producers without raising prices for consumers.

Exporting countries should take care of their impacts on the international market and of rising costs related to increasing production (see Box 12). In order to reduce the risks associated with agricultural activities (see section one), the floor price has to be publicly announced at least before the crop year starts.

The price band has to be wide enough so as not to discourage private operators. The gap is highly dependent on transport and storage costs in the country. A gap of 50% between the floor and ceiling prices would generally be sufficient to avoid the eviction effect.

Another question relates to the use of pan-territorial or differentiated regional prices: the former may be easier to implement but the induced effects on remote areas, which are in this way advantaged, must be taken into account; the latter make it possible to take into account transport costs and have less negative impacts on traders. The Malawi case study illustrates a situation where, because of high transportation costs, pan-territorial food prices tend to maintain production in some areas where it would not be profitable without pan-territorial prices.

Impacts of Initial Endowment in Factors

It is worth noticing that price stabilization policies may have detrimental effects when the initial distribution of productive resource is very unequal (see Box 7). This kind of policy will benefit producers who are well endowed in land and capital more than others. Those who have the largest farms and the best links to the market are in a position to increase their marketable surpluses. In contrast, the price stabilization policy will not have any effect on farmers not trading on markets at all because their access to land is so limited that they do not produce enough to sell. For this specific population, other measures, such as free input distribution or income diversification support, have to be implemented. The question is slightly different for net buyers who sell their harvest and have to

[6] Notice that the same effects are, in principle, obtained by subsidizing inputs.

buy products at a higher price during the year. For them, price stabilization policies would improve their situation and maybe allow them to become net sellers. This underlines that pricing policies should not be addressed independently from other policies. Policy coherence needs to be sought in order to be sure that the pricing policy is pro-poor. The issue of inequalities in the distribution of production resources must be addressed in a serious way. In some cases, policies targeting specific sectors of the population may be an appropriate solution even if this involves complex institutional matters, as will be seen below.

Box 7. The Importance of the Initial Distribution of Productive Resources

In **Zambia**, **Kenya** and **Malawi**, a large proportion of producers are net buyers.

In **Zambia,** a large share of producers do not have produce enough to sell surpluses. What is more, they never sell and therefore cannot benefit from a price stabilization policy. Since land distribution is very unequal, only the larger producers benefit from the policy at the expense of the smaller ones. Cereal consumption indicators show there has been little—or no–progress in food security and the increase in production is mainly exported while 40% of the population is affected by malnutrition.

In **Malawi**, agriculture generally consists of small-scale farmers. A critical issue is the very smallness of cultivated tracts of land (less than 0.5 ha per farmer). In this case, free input distribution programs seem to be very successful in terms of increasing maize production. These programs enable intensification, even for farmers who are not linked to markets but who will depend on the development of extra-farm activities to see an increase in their incomes.

In **Kenya,** agriculture is characterized by a dual structure: the top 10% of farms account for 85% of all domestically marketed maize, while 62% of rural smallholders are net maize buyers. Given this structure, the National Cereals and Produce Board (NCPB) policies designed to increase the domestic price of maize in 1995-2004 had the effect of transferring income from three million urban consumers and almost sixteen million small-scale farm households (net maize buyers) to five million small-scale farmers in a high potential area for maize and a few thousand large-scale maize farmers (net maize sellers).

In **Brazil**, since 2002, in the context of very unequal distribution of production factors and incomes and a high percentage of the population in a situation of poverty, Agriculture's Food Acquisition Program (PAA) has been targeting specific population groups:

- small-scale family farmers, with a clear objective of strengthening smallholder farming (productivity and product quality) by purchasing products at a fair and stable price; and
- vulnerable consumers (through school restaurants, hospitals, associations, etc.) with a clear objective of improving access to food for the poorest, both in terms of quantity and quality (in particular, the distribution of milk for children).

However, such targeting requires strong administrative capacities (definition of criteria, registering, controls, etc.) that generally do not exist in LDCs.

Storage and Financial Capacities

The size of public storage capacity and the access to flexible resources are fundamental parameters because the state has to be able to buy enough products to maintain the advertised floor price. As will be argued below, the credibility of the policy is of utmost importance. This implies that the state do what it has promised to do and therefore that it has access to sufficient financial resources and storage facilities. Storage could be the result of a public-private partnership where the state contracts with private actors for a given amount of storage. Such arrangements get private actors involved in the policy process and reduce the costs associated with public activities (generally higher than private actors' costs).

Costs and Management of Over-Supply

When reserves of productivity exist, production may rise very rapidly and result in surpluses. This makes storage more expensive and the export of surpluses more difficult. It might generate adverse effects on the world market. Because many countries were not able to properly manage costs, they had to withdraw from market regulation. When a country shifts from importer to exporter position and when domestic prices are higher than international market prices, the issue of how to deal with surpluses takes on the utmost importance. In the past, this has often been managed through export subsidies at very high cost (European Union) or through international food aid (United States). Such policies create unfair competition and may damage the local production of trading partners (see Box 8). Policy adjustments are therefore crucial to avoiding excessive costs. This could be done by decreasing the level of floor prices (but at the cost of bankruptcies if farmers had to go into debt), quantitative limits on production or measures such as contract farming (see below), which provide a guaranteed floor price for only a predetermined quantity of production.

While food price stabilization policies' costs such as public storage are high, they have to be compared to food price instability costs (social costs derived from food price instability for producers and/or consumers). These later costs are difficult to estimate and further research is needed to carry out cost-benefits analyses of food price stabilization policies that consider the welfare of tax payers, producers and consumers alike.

It also seems inefficient to maintain high prices to support an agricultural production for which a country does not have any competitive advantage (and that would not be competitive without the price support system if subsidizing exports is not considered). However, surpluses are not necessarily a problem and quantitative limitations on production are not necessarily relevant when surpluses are considered from a regional perspective for instance. Intra-regional trade therefore requires political consensus among countries as to which country has comparative advantages for a given production and could supply the region, which is not an easy task (see below).

Box 8. The Crucial Question of Cost Management

The difficult transition from importer to exporter is illustrated by the cases of Indonesia, Zambia, Malawi, and the EU.

In **Indonesia**, Bulog has experienced a dramatic increase in its costs, especially when it has to manage surpluses ($30 million US per year in 1969-1974, $80 million in 1970-1984, then $90 million in 1993-1994, and even $200 million when export subsidies are included), which has almost lead it to bankruptcy. However, Bulog had access to financial reserves partly because of the increase in the price of oil. Moreover, rising costs (due to large stocks, subsidized exports when there were surpluses and subsidized imports when there were production deficits) led to reforms and adaptations by Bulog: reconsideration of the floor price, removal of fertilizer subsidies and the ceiling price announcements. In **Indonesia,** the policy option was to act on the relative prices of inputs and production.

In **Malawi**, it seems that because adjustments were not made in time, stocks accumulated, surpluses were exported at a loss, and the costs involved with the storage policy increased, putting the state in the position of not being able to provide price support in some remote areas.

Zambia benefited from revenues generated by copper.

In the **EU**, surpluses were exported at subsidized prices that created unfair competition with producers based in importing countries.

In **Guinea**, potato surpluses can be exported to neighboring countries. In this case, exports tend to enhance a regional integration process, and can partially replace imported potatoes in importing countries.

In **Brazil**, it seems that the program purchasing products from smallholder farms avoids the adverse effects of over production by limiting the amount of direct support per farmer and per year.

The question of cost management is also critical in situations other than surplus management. In **Mali,** for instance, the Office in charge of managing the intervention stock has had difficulties accessing financing. Two public buffer stocks exist in Mali, but none of them has proper financial capital: stocks managers have to search for credit before buying cereals. In a situation of rising prices, this implies both delays and a smaller scale of intervention, which ultimately undermines stocks' capacity to overcome price raises. This occurred in Mali during both the 2005 crisis and the 2008 crisis, when only 28,000 T and 53,000 T were able to be destocked, which was insufficient to really influence price levels.

This in-depth analysis of countries' experiences allows for the following recommendations to be formulated.

The ability to properly design policies and set a number of technical parameters is a key factor in ensuring the effective functioning of price stabilization policies. Their adequacy to the specific economic, social and institutional context of each country and each government's objectives, and the ability to foresee and adapt to changing contexts are key factors for success. This therefore requires high technical capacities and access to a large range of information and analyses. It is important to evaluate in advance the impacts of policies on the various types of households and possibly which sub-population to target.

Clear differentiation between long-term and short-term objectives and good understanding of substitution effects between products (which depend on the nutritional features of the products as well as food habits) are necessary. Pricing policies should be part of a coherent set of policies involving several instruments. Policies should accompany, but not replace, private operators. States should have the means to implement their policies, in particular sufficient financial resources and expertise to shape, implement and adjust actions.

3.2.2 Political and Institutional Factors

Considering the processes by which policies are defined and implemented, different factors play a decisive role in the policies' ability to smooth food price volatility. The case studies led in different national contexts reveal that perverse effects can occur when policies:

- are not very effective,
- are not very predictable, and
- do not reflect a plurality of interests.

The ***low effectiveness of policies*** is a factor that can undermine policies results, particularly in low income countries characterized by weak state capacity and/or legitimacy. In these contexts, announced price policies tend not to be effectively implemented or to be by-passed by private actors (who are not punished for by-passing them). Indeed, the low effectiveness of policies can be attributed to either low financial capacities or low enforcement control. Financial capacities are a crucial determinant of policies' successes in the case of stock regulation, as seen above, and production enhancement measures, while enforcement control is a crucial determinant of policies' successes in the case of trade control. Drawing from the Malian case, Box 9 gives an illustration of the importance these factors can have in policies' results. The Mali example can be extended to other low income countries that either lack financial capacity and autonomy (dependency upon foreign aid) or can barely enforce the compliance with policies (corruption and by-passed policies). These situations call for recommendations in terms of State capacity building, and are consistent

with the recommendations made by the Organization for Economic Cooperation and Development (OECD) and by the World Bank in "fragile states"

Box 9. Policy Effectiveness: Financial Capacities and Enforcement

The **Malian** government implemented food price policies through trade control measures (export restrictions, import tariff wavers) and marketing measures (input subsidies, food security stocks). However, these measures did not always have the expected effects because of poor public financial capacities (see Box 8) and reduced enforcement.

During the 2005 and 2008 crises, exports were banned in Mali, but this decision was not respected by private operators who decided to export illegally across unsupervised borders or through informal agreements with customs officers. Due to a low capacity for enforcement and punishment, the government could not end these illegal exports and act upon price levels.

Other countries that do have proper and consequential financial capacities can, on the contrary, better ensure their policies' enforcement and control. This is the case, for example, in **Zambia** and Indonesia where the high public cost of regulating prices is respectively covered by revenues from the copper and petroleum industries. In Brazil, the implementation of a complex program such as the PAA was possible thanks to the State's strong administrative capacities and because the State devoted significant financial and human resources to the program.

The ***low predictability of policies*** is a second institutional factor that can undermine policies' ability to smooth food price volatility. This refers to the degree of transparency in the information the state provides on what policies have been decided. When this information is transparent, private actors can correctly anticipate state actions and take them into account in their own actions. However, when the information is not very transparent, private actors can hardly anticipate what the State's actions will be and may prefer to act as if policies were simply absent. This eviction effect is particularly strong in the case of trade control policies. Drawing from the cases of different East African countries, Box 10 illustrates the importance of policy predictability in determining policy results. These situations call for the encouragement of transparency in policy processes.

Box 10. Policy Predictability

Studies conducted in **Zambia**, **Kenya** and **Malawi** show that the volatility of maize prices was exacerbated by discretionary policies. The unpredictability of trade policies led to diminished interest by private actors in marketing and trade functions, and resulted in situations where prices fluctuated more than necessary. In Zambia, in 2001 and 2005, drought led to price fluctuations that were exacerbated by government interventions: the government advertized maize imports to contain rising prices, but publicly supported imports were arranged too late and uncertainties about the level and pricing of these imports limited private imports, resulting in very large increases. The story is similar in Malawi and Kenya. In Malawi, for example, exports were banned in 2006 and 2007, despite above average harvests, worsening maize prices situation for net maize sellers. In Kenya, in 2008, delays in government imports pushed maize prices higher and maize prices stayed at very high levels in late 2008 despite the tumbling of world prices (a state of emergency was declared in January 2009 and the import duty was finally lifted).

On the contrary, when policies are relatively transparent, private actors can anticipate public actions and position themselves in markets efficiently. **Madagascar**, with the running of the Rice Platform, is a good illustration of the positive influence predictable policies can have on price regulation.

The fact that ***policies may not reflect a plurality of interests*** is the third factor identified through the case studies that may undermine policies' results. In some countries, policies can be assimilated to the attribution of rents to a limited number of actors (Zambia for example, see Box 11), while in

other countries policies seem to be more legitimate and are the result of dialogue and/or negotiation processes where different actors have the capacity to represent and defend their interests (Madagascar for example, see Box 11). These examples call for greater attention to the influence that private actors do indeed have in policy making processes. Recommendations should focus on the enhancement of transparent and pluralist systems of interest representation but they must take into account the capacity of actors to effectively represent and defend their interests in dialogue and negotiation arenas as well. In some cases, capacity building programs are needed to ensure actors participate in these policy making processes.

Box 11. Policy Appropriateness for a Plurality of Interests: Dialogue Processes as the Key?

In **Zambia**, maize trade and marketing policies tend to benefit a small number of actors, and as a result their redistributive effect can be questioned. Pan-territorial prices benefit net seller producers only (and not to the smallest producers who are net buyers), and are strongly influenced by the Zambian National Producers Union. Import licenses are attributed selectively to industrial millers and traders, who tend to maintain close relationships with government officials. There are no official dialogue and negotiation arenas, and marketing and trade policies are defined in a way that is not transparent.

In **Madagascar**, rice marketing and trade policies have been discussed since 2005 within a "dialogue platform" where the different actors of rice sector are represented, and where market information is analyzed. Since then, domestic markets have stayed relatively calm in comparison with international markets. Guinea provides another positive example of when discussions between actors led to the implementation of private measures that regulated the operation of potato markets.

In Brazil, the proactive participation of different stakeholders (farmers' cooperatives, enterprises, social control councils and committees, etc.) has been one of the reasons for the success of the Agriculture's Food Acquisition Program (PAA).

While the implementation of mutual information processes seems to be a promising innovation, accompanying policies aimed at strengthening actors' capacities have to be encouraged as well in order to help actors better define (expertise) and defend (negotiation) their interests.

Effectiveness, predictability, and appropriateness for a plurality of interests: these three factors influence policies' ability to lower food price volatility. The case studies led at national level highlight their influence, which depends on the political instruments considered (see the Table in Appendix 3).

At the regional scale, the experience in West Africa tends to demonstrate that these political and institutional factors are particularly critical for attaining the positive results expected from regional integration (see Box 12).

Box 12. Advantages and Limits of Regional Integration for Addressing Food Price Volatility

Today, regional integration processes, which are seen as a powerful driver for development, tend to be growing stronger, particularly in Africa.

In theory, many advantages are expected from regional integration (De Melo, 1993; Hugon, 2005), which could be favorable for price volatility reduction compared to actions at the national and international levels. Here, one can mention a wider and more competitive market, economies of scale and better allocation of resources, a more stable and predictable institutional environment (national policies are "locked" within common policies, national lobbies are limited), standardization and "commoditization" of regionally exchanged products, reduction in transaction costs (due to geographical, socio-economical, and cultural proximity) compared to the international market, etc.

In West Africa, ECOWAS is currently reflecting on how to address food price volatility in the framework of its Common Agricultural Policy (ECOWAP). Reflection focuses on both common trade instruments (which is a

fundamental part of regional integration and quite advanced), and regional cooperation to manage food security stocks and social transfers. Indeed, the regional dimension of food crises in West Africa, as illustrated in 2005, encourages countries to start building a regional approach to the management of food price peaks.

However, the economic heterogeneity of West African countries, the different sensitivity to imports (less for landlocked countries or the CFA franc zone), the divergent interests, differing points of view on trade, and the relative newness of the integration process make it difficult to see the advantages of regional integration. For instance, the Free Trade Liberalization Scheme adopted in 2004 is far from being effective (there are still many obstacles to trade within the region), and the finalization of a Common External Tariff is facing considerable difficulties.

The Desirability and Feasibility of Public Intervention at the National Level: Some Concluding Remarks

The analysis of past and current experiences with market regulation reveals some encouraging successes and allows one to highlight some common features in these experiences. Management of agricultural price instability has to be part of a larger agricultural policy design according to the specific context and objectives of the country in question. A wide range of instruments exists and combining these instruments in policy mixes is recommended. To avoid the excessive costs often linked to public intervention, instruments can be implemented by private operators under public supervision rather than exclusively by public actors.

All the problems faced by rural areas today will not be solved by market regulation. Other measures will be necessary, but reducing risk appears to be a condition for increasing labor productivity and incomes in poor areas. Measures aiming at improving market operation (information, discussion, standardization, etc.) as well as measures mitigating the negative effects of price volatility (such as social transfers) are complementary to market regulation. They will not be enough.

Some of the desired features of market regulation can be drawn from national/regional experiences. The desirability of price stabilization is highly dependent upon the general situation of each country, and policy design must be context-specific. If one seeks to replicate experiences, then many factors have to be considered, including the country's level of development, the proportion of the population in the agricultural sector, the external trade balance, the location of production areas, land distribution, transportation facilities, and the institutional and political contexts. Regulation has to be flexible, part of a broader agricultural policy that is constantly adapted to changing conditions in world markets and domestic production. This implies having a team of experts to analyze the situation and a wide range of information available.

Policy success in poor countries is highly dependant on the existence of productivity reserves. These reserves may come from technological innovation or better access to capital. The later can be obtained through the provision of public goods such as irrigation facilities or inputs subsidies. The problem is generally the cost of this kind of policy when public funds are scarce. In order to keep flexibility in the system, the policy should not aim at maintaining a completely fixed price. Rather, it should allow for a relatively wide and flexible band between floor and a ceiling prices in which the private sector can operate. This band has to be adapted over time in function of domestic and international conditions, which supposes extensive expert analyses. State interventions should be rules-based and relatively predictable; the stabilization agency should have flexible and sure access to financial resources. To be legitimate, the policy must consider the opposite interests of the actors involved, and has to be the result of discussions and negotiations among actors.

Collaboration between public and private actions seems very relevant. In particular, physical handling of commodities could be left to private firms, even if the latter receive a State price guarantee.

Private-public partnership could also be considered for storage: public actors (central states) would act as “project owner” and decide whether to buy or release stocks while private actors (banks, producers’ organizations) would act as “project supervisors” and sell or buy food and cover the financial cost of holding stock according to public decisions (contract between the State and private actors). This makes it possible to simultaneously solve two problems associated with public intervention: excessive commercialization costs and the eviction effect.

Price stabilization mechanisms (based on a price band defended through storage and imports under public supervision) or public contract farming (which guarantees prices for predetermined quantities attributed to peasants’ organizations) are efficient ways to stabilize prices. With the first option (price stabilization based on a price band), it is necessary to control external trade unless the price band is always included in the band defined by transfer costs from or to the international market. In this case, speculative attacks by the regulation agency are also avoided. If large fluctuations in international prices move the domestic band out of the band defined by transfer costs, trade regulations are necessary. This could be done by quantitative restrictions such as import licensing or variable tariffs, adjusted to maintain the domestic band within the larger band defined by transfer costs between the domestic and international markets.

With the second option (contract farming), controlling external trade is not necessary because the guaranteed price concerns only predetermined quantities of products. Another advantage of this solution is that it allows one to target specific categories of farmers.

However, the problem associated with quantitative measures is that they are often associated with bribery and rent-seeking behaviors. As stated above, some paths forward exist: rules-based, transparent public interventions combined with clear and prompt action against corruption, and capacity building ensuring that the different kind of actors are able to defend their interests may make it possible to define institutions and mechanisms to minimize these adverse effects.

It has to be noticed that the compatibility of such measures with WTO rules is not guaranteed. Price stabilization instruments such as buffer stocks or guaranteed prices should generally be lowered (they are included in the “amber box” of trade-distorting subsidies). Public stocks can only be maintained as part of a food security policy, and if they do not aim to support production through producer prices that are higher than international prices (see the WTO’s Agreement on Agriculture (AoA), Appendix 2). Structural stabilization instruments on import prices such as variable levies are strictly forbidden (AoA, Article 4:2), and import price bands have been challenged in the Dispute Settlement Body (the Argentina-Chile dispute). Only punctual measures such as the AoA’s Safeguard Clause (SGS) allow for the increasing of tariffs beyond bound rates. Moreover, since many developing countries under structural adjustment did not notify price stabilization and non ad-valorem protection instruments (e.g. specific customs duties, tariff-rate quotas, etc.), they are no longer allowed to introduce these instruments. Many developing countries are also not allowed to use the SGS because they used ceiling tariff rates.

However, some flexibility exists for developing countries in the WTO arena, especially the least-developed countries. Customs duties can be modified since they remain below the bound level (this is very relevant for countries that have relatively high bound tariffs and are not subject to structural adjustment constraints). In addition, WTO rules are not fixed and the current negotiations, while they do not call into question the liberalization trend, offer an opening to get more policy space for the use of some instruments. Some (“small”) developing countries have used or still use non–WTO compatible instruments with nearly no risk of complaints. Finally, regions such as West Africa—if ECOWAS becomes a WTO member—are also little exposed to WTO complaints.

More market-friendly measures, such as the warehouse system or insurance, have the advantage of being clearly WTO compatible. However, they induce costs for farmers without significantly decreasing risks, and therefore do not seem to be as efficient as price stabilization mechanisms or contract farming.

4 – Which role for the international community?[7]

Obviously, the management of the instability of domestic prices is the responsibility of the governments. However, different considerations lead to think that some support of the international community can be needed:

1. The *governments of many developing countries can lack of reliable information on international markets.*
2. The *resources of the governments of many developing countries can be too limited to fund price stabilization policies or policies aiming to mitigate the effects of price instability* (safety nets and other related D-instruments).
3. The increase of international food prices can reduce the currency reserves of importing countries (Sarris, 2010). For some countries, this can imply *a rationing of food imports*. For others, it can generate a deficit of the balance of payments and *a decrease of the exchange rate*, inflation and a loss of purchasing power for consumers. This problem affect only countries with low currency reserves and/or countries for whom food import represent a large part of the balance of payments.
4. The policies developed at the national level to reduce the transmission of international instability to domestic markets (e. g. variable levies on imports, restriction to export) are not always effective because of their budgetary cost and of the difficulty of some states to control effectively the borders. Moreover their use is bounded by the WTO rules. Besides, these policies can increase the instability of international prices. The restriction of exports in case of crisis can cause *shortages* like the one some importing countries experienced during the 2008 crisis. Policies aim at insulating the domestic market narrow the size of the international market and, as a consequence, make it more vulnerable to climatic shocks. This implies an increase of international instability with strengthen the incentive of the countries to insulate their domestic market (Keynes, 1942). This phenomenon has been observed since 2008 with a strong development self sufficiency policy and land grabbing. Hence, there is a need of international rules to arbitrate between the need of the countries to protect them of international instability and the need to reduce the destabilizing effects generated by these policies.

These considerations lead to the conclusion that some action at the international level has to be considered to complement the actions at the national or regional levels. We will first present a brief historical analysis of how the problem of price instability has been addressed at the international level. Then we will present what the support the international community could provided in the next years. We will distinguish different type of support: the provision of public goods, the transfers to the states of some developing countries and the setting-up of international rules.

4.1. Historical analysis of price volatility

International food prices volatility has a history. Its characteristics (importance), its causes and the solutions imagined to deal with it have changed through time. Food markets experienced structural transformation that changed the way international prices are determined and the role they play in balancing world production and consumption.

Since WWII, the history has been punctuated by several attempts of international cooperation aiming at regulate international food markets. Starting from a situation of food markets characterized by:

[7] Franck Galtier, Nicolas Bricas et Benoît Daviron (Cirad, UMR Moisa)

- a general situation of overproduction and/or production factors surpluses;
- a disconnection of domestic prices and international prices organized by agricultural policies;
- a share objective of national self-sufficiency (except of course for tropical products) that implied a limited involvement in international trade.

Two radically opposite approaches followed one another:
The 1960s and 1970s was the golden age of the international commodity agreement. The aim was to stabilize (actually support) international prices on the basis of international stocks and/or export quotas. International cooperation was then conceived as a coordination problem within nation-states oligopolies in a way to manage collectively production surpluses. This was the very meaning of the international commodity agreement.
From the mid-1980s to the mi-2000s, overproduction was still the problem but the proposed solution was instead to organize a general and coordinated dismantlement of agricultural policies that isolated domestic markets from international markets. WTO negotiations were organized for such an objective. Because of the increasing involvement in international trade (as exporters or importers), disconnection between domestic prices and international prices was becoming increasingly costly for national budgets. Of course international price stabilization (even less price support) was not an explicit objective of WTO negotiations. Yet, it was expected that overproduction would be eliminated by the liberalization process and then that price would be higher (remember the meticulous estimation of the WTO negotiation impact on international markets!). Moreover, an open world market was supposed to absorb easily production shocks.
More than 20 years later, the result situation is quite different from what was expected. First the dismantlement of isolating agricultural policies is clearly incomplete. Some countries did it (EU, USA) but others countries, bigger and bigger countries (China, India) did not. Secondly, overproduction did vanish, as illustrated by the low level of world stocks. But this current situation of world supply and demand rises two questions:

- Are we still in a period characterized by structural overproduction as such as most of the decades following WWII? Are the agricultural frontiers not close to their end? Is the age of cheap energy not ending? Are the booming Asian economies generated an increase in food demand radically new?

- Is it really possible to get some stability in international prices without a certain level of overproduction? Is overproduction a necessary condition to get of a volume of stocks big enough “to absorb” productions shocks?

It is too early to build a full interpretation of this renewed volatility. Two different and opposite perspectives can be adopted:

- The 2007/08 crisis can be seen as mostly a transition crisis. It signals the strains generated by the incompleteness of the liberalization process. In some countries domestic prices are still too disconnected from international prices. Public agencies are still too active in food storage to allow private actors to invest in the business. Thus liberalization must be pushed further.

- The 2007/08 crisis can be interpreted as a evidence of the non-viability of the liberalization process. No governments can accept to expose its populations to “foreign” instability and international markets are intrinsically instable. The crisis confirms the relevance of the Chinese and Indian refusal to link their domestic prices to international prices. China and India must resist to the call for further liberalization and the rest of the world must adopt their position.

It should be very useful to discuss these two perspectives and to build a consensus on the interpretation 2008 crisis in order to design policies for price instability management. But the building of such a consensus will take time. We can assume that after a period of surpluses, we are entering a period of scarcity or, at least, of greater tension on international markets (booming demand of emerging countries, rising oil prices...). IPCC 4th report assumes that climate change will affect agriculture production, not only changing land use in each region of the planet, but also increasing instability. “It is very likely that hot extremes, heat waves and heavy precipitation events

will become more frequent" (IPCC, 2007). In any case, 2008 was not a single accident and international markets seem to be durably more instable. In such a context, what are the possible strategies and available or possible instruments to manage this instability at the international level?

Box 13: Some facts regarding the evolution of the international wheat prices during the XIX° century

During the long XIX° centuries, in the Atlantic economy, wheat prices tended to converge and to stabilize. This is clearly illustrated by Fig. 1, 2 & 3 that present current monthly wheat prices (in dollar per quintal) in New York and Liverpool. The first graph presents the overall evolution from 1800 to 1913 and the next ones "enlargements" limited to Liverpool prices at the beginning and the end of the long XIX° century.

Prices in New York and Liverpool show an obvious convergence. At the beginning of the century prices in Liverpool were frequently twice the prices in New York. Then they tended to become equal and synchronized. O'Rourke et Williamson (O'Rourke and Williamson, 1999) have demonstrated that this price convergence is apparent in the whole Atlantic economy.

Moreover, price stabilization is remarkable. The phenomenon is particularly pronounced in Liverpool (see Fig. 2 & 3). At the beginning of the XIX° century wheat prices could double or be divided by 2 in a few months. Before WWI, price volatility has been markedly reduced – less than 25% –, and whit an astonishing stability between 1897 and 1907.

How to explain such price stabilization? The enlargement of the market can be mentioned, but it is certainly not the only cause. Various institutional innovations contributed. Cereal standardization, starting in Chicago in the 1850's (Cronon, 1991) helped to reduce the substitution costs between origins and then helped to increase the number of suppliers. The creation of future markets, that followed the creation of standards, and the building of telegraph networks, reduced information and storage costs. English wheat imported, at the end of the XIX°, like African rice importer at the end of the XX°, may be adopted a price stability strategy to promote the consumption of imported food. Whatever the explanation, price stability prevailed in a time of victorious free trade and when, at least in the United Kingdom, no public policy influenced price formation.

Fig. 1 : Wheat Monthly Prices on Liverpool and New-York Markets 1800 – 1913

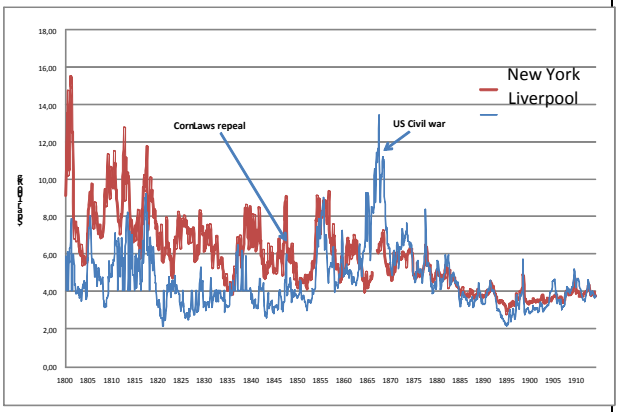
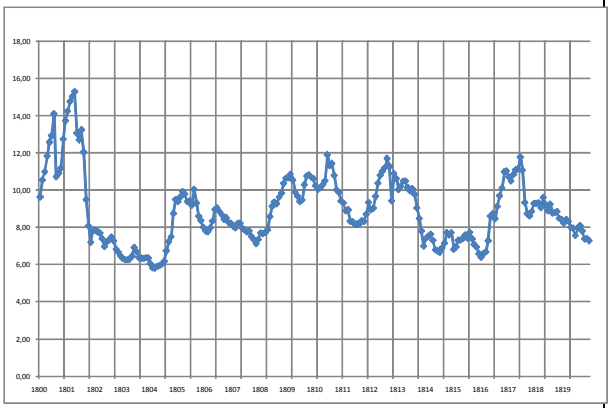
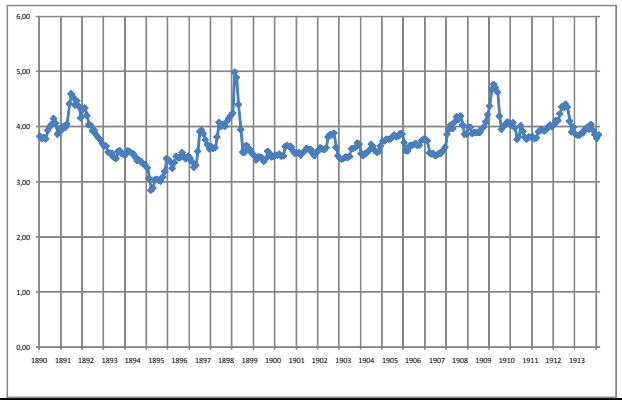


Fig. 2 : Wheat Monthly Prices on Liverpool Market 1800 - 1820



The data used in this box come from David Jacks who realized an amazing compilation of wheat prices for the XIX° century (see his internet site http://www.sfu.ca/~djacks/data/publications/publications.html)

Fig. 3 : Wheat Monthly Prices on Liverpool Market 1890 – 1913



Box 14: International food price volatility since WWII

From WWII to the 1980's, food markets were characterized by the omnipresence of governments and a policy norm of national-centered food markets. Using different kind of instruments (*caisse de stabilisation*, variable levies, export or import quotas, public purchases, food aid…), governments organized an almost complete disconnection between domestic prices and international prices. Domestic prices stability was an objective worldwide adopted. Foreign trade was subordinated to its achievement. Exports and imports were synonym of surplus and deficit that must be eliminated to guarantee domestic market equilibrium. From this point of view domestic stability was guaranteed by transfering domestic instability on international market. During this period, the international markets operated like canal locks between national markets. They handled the transfer of products without calling into question the level and stability of prices in the national areas.

In spite of the residual nature of trade (and in spite of the teachings of economic analysis), the international prices of most food products displayed marked stability from the end of the 1950s to 1972 (Fig. 1 & 2). This is explained by the structuring of the international markets as hierarchic and/or co-operative oligopolies. Indeed, management overseen and centralized at national foreign trade level gave the country (or nation-state) the status of basic unit on the international food products markets. Furthermore, the mastery of foreign trade was accompanied by states taking control of stocks, that is to say the switching of market power from firms to states. In this context, practically all the international markets assumed the structure of nation-state oligopolies.

Fig 4 : International Food Price Index 1957-2009 (Source : IMF)

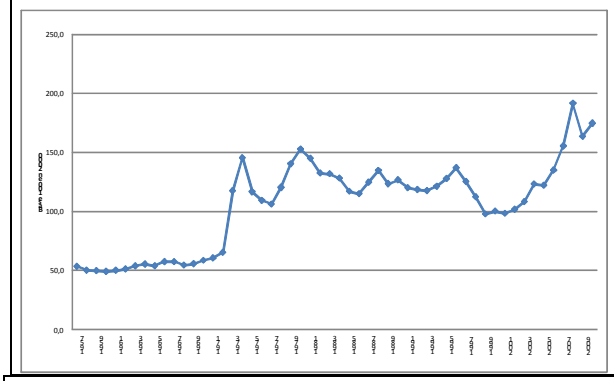
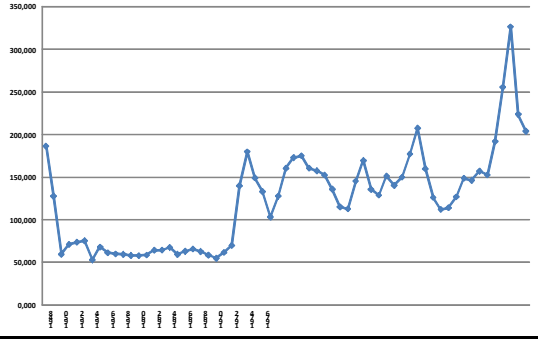


Fig 5 : International Wheat Price Index 1957-2009 (Source : IMF)



Then, a number of co-operation features in fact emerged in these oligopolies during the decade following the Korean War: the FAO Consultative Sub-Committee on Surplus Disposal, international agreements on wheat and coffee, the Food Aid Convention or the GATT regulation on dairy products, and so on. These institutions were usually based on a solidly established hierarchy between countries and the existence of an uncontested leader.

The co-operation in the product institutions was amply completed by the residual supplier strategies used by this/these dominant country/countries: USA-Canada wheat duopoly, USA for maize, soybean and rice, New Zealand on the milk market, Brazil for coffee… To guarantee international price stability, these countries acting as residual suppliers, adjusted their exports to their competitors exports and took on the world storage burden.
The early 1970s featured the start of a period of marked price instability on the food product markets. This instability first took the form of a series of price leaps affecting all the commodity markets one by one. Crises in demand (the oil producing countries, the USSR and China) have often been highlighted to explain this period of tension in prices. However, the exhaustion of the stabilization capacity of the market leader countries goes more towards explaining the large prices rises than the sudden import demand. As was shown by the subsequent events, and in contrast with the alarmist diagnosis of the time, the shortages that occurred were not caused by the increasing scarcity of global resources but by changes in the policies of the leading countries. The main reason for the low level of world stocks of agricultural products at the beginning of the 1970s was the inflection in the policies (storage and production) of the leading countries which, from the end of the 1960s onwards, thus refused to cover the entire cost of the stabilization of the international markets.
The change in the markets in 1982 (the date of the beginning of recession in the United States and the international financial slump) from a situation of shortage to one of surplus—resulting from the fall in import demand—abruptly revealed this absence of a stabilizing mechanism and the disappearance of the safety net provided by the storage policies of the leading countries. At this stage, the oligopolistic structure of the markets was not called into question but most of the oligopolies were destabilized, whether they concerned tropical or temperate products. The beginning of the 1980s marked the beginning of fierce competition in a context in which new exporters (the European Union and the so-called New Agricultural Countries as Brazil, China, Thailand…) joined the list of suppliers. International prices reflected this new situation immediately. Even though the surpluses were not as substantial as those of the 1960s, prices fell sharply on a scale unequalled since the depression of the 1930s. The fall in international prices went with a fragmentation of international food markets provoked by the differentiation of the price conditions offered by the exporting countries. This differentiation obscured the very low level of the prices actually used in the transaction. For commodity such as wheat or coffee, actual prices lied between one and two according to the destination.
In developing countries with no financial reserves, the fall in international prices caused the bankruptcy of numerous state marketing boards and initiated the wane of post WWII state interventionism. For the developed countries and their domestic agricultural market systems the fall resulted automatically in the rocketing of the cost of support revealing the mismatching of the 'national-centered' model to too large an involvement in foreign trade.
The opening of the Uruguay Round negotiations in 1985 marked the awareness by OECD countries of the impossibility to continue with the national-centered model. Even if the Uruguay Round negotiations have been far from having achieved the total dismantling of the agricultural support mechanisms in the developed countries, the tariffication principle has clearly called into question the disconnection of national markets in relation to international one: if domestic prices remained distinctly higher than international prices, they were now supposed to vary in line with world prices. This revision of agricultural policies negotiated in a multilateral framework took place at the same time as a more rapid, sudden withdrawal in the developing countries that had 'adopted' structural adjustment policies. The reduction of import barriers and the closing of state marketing boards were much faster and more radical within this framework. Thus, a clear reunification of the world market (or part of the world market as we will see) has been accomplished from the mid-1980's to the mid-1990's.
Then, began a short period of international price stability that could be associated with the end of the trade war provoked the Marrakech agreement. But this stability (Fig.3), particularly visible on the rice market (Fig 4), has been short-lived. From 2005, progressively, the price on most of the commodity markets started to rise, and from 2007 began to skyrocket, doubling or trebling within a few months. The price explosion is immediately followed, in mid 2008, by a dramatic fall though they remained higher than they used to be before the pike.

Fig. 6 : International Wheat Monthly Prices 1980-2010 (source : IMF)

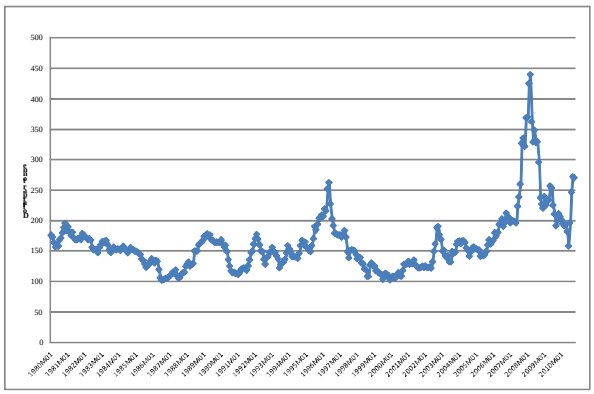
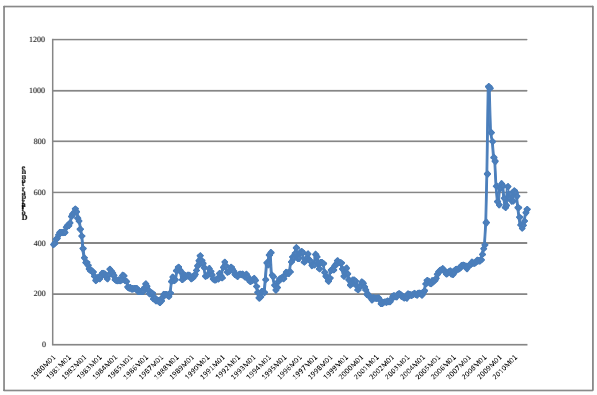


Fig. 7 : International Rice Prices (5% Fob Bangkok) 1980-2010 (source : IMF)



- Besides its impressive scale, the current international food prices volatility possesses a double specificity:
- It is part of a general destabilization of the raw material markets, frequently illustrated by the oil market, but that many other commodities - like cooper (Fig. 5) - are experiencing.It has been transmitted, as a result of liberalization policies, in lot of countries where farmers have been living for decades sheltered from international prices volatility. Thus, it has been perceived by many more actors than the previous periods of volatility. France is the very good illustration of such a country (Fig. 6). It should be noted that some countries, and not the least (China and India for example, Fig. 7 & 8), kept intact the disconnection of their domestic market.

Fig. 8 : International Cooper Prices 1980-2010 (source : IMF)

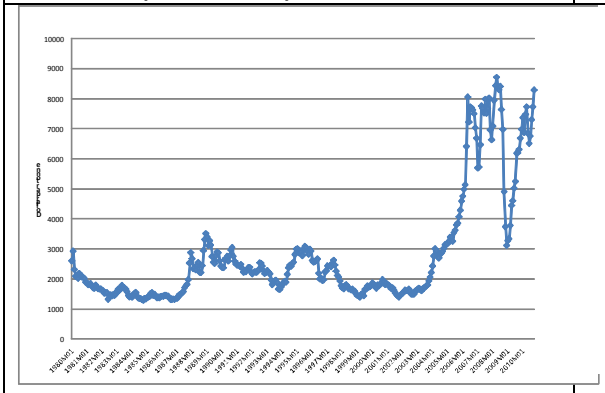


Fig. 9 : Wheat Prices on the International and France's domestic market 2006-2010

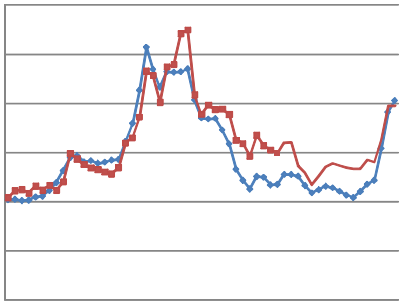


Fig. 10 : Wheat Prices on the International and China's domestic market 2005-2008

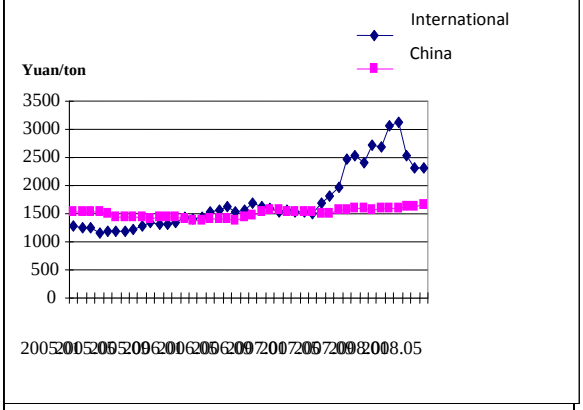
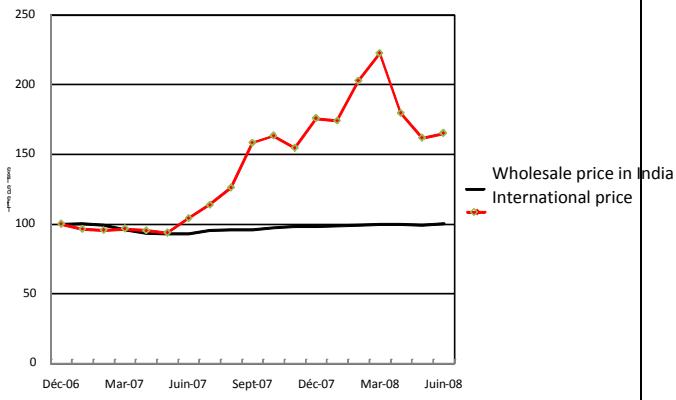


Fig. 11 : Wheat Prices on the International and India's domestic market 2006-2008 (Source : OECD)



4.2. What can be done by the international community?

In order to discuss an agenda for the international community, it can be useful to distinguish three main functions for public action:

- *Provision of public goods* like information in order to improve coordination and decision.
- *Financial aid or transfers* (from one country to another).
- *Settlement, monitoring and enforcement of common rules* for national policies.

a) Provision of public goods

As far as price instability is concerned, the role of public goods is to allow a better functioning of international markets by making them more transparent and by improving the quality of price expectations. Transparency can reduce endogenous instability (speculation, panics, cobweb etc.). Hence, he public good that should be provided by the international community is **information to make the (physical and derivative) markets more transparent.** Speculative bubbles and panic dynamic are fed by the lack of market transparency. As far as *derivative markets* are concerned, the problem referred mainly to OTC. A solution could be to develop standards on OTC and to widespread some aggregated information on OTC activities. Regarding *physical markets*, some data are already widespread for free by the USDA, the FAO and the International Grain Council. However, the analyses of these data, provided by private companies, are often expensive. As a consequence, there is a lack of knowledge on the future evolution of market fundamentals (production forecasts, evolution of the agricultural and commercial policies of the main exporting and importing countries and other prospective information). This information should be comprehensive enough to allow poor countries to estimate the evolution of import and export parity prices (it means that not only international prices should be included but also exchange rates and cost of fret). The production and diffusion of this information could be done by the International Grain Council (for cereals) and/or by the Global Information and Early Warning System of the FAO (both of them are partially doing it). Moreover, many private and public operators, especially in developing countries don't have a capacity for market intelligence, either because information on international markets is expensive either because they don't have experts able to analyze it. A technical support to national and regional Market Information Systems (MIS) is required. This instrument will improve the expectations of private and public stakeholders and, by this way, will reduce speculation and panic behaviours both on derivative and physical markets (including the behaviour of governments as those based on exports bans).

b) Transfers

Transfers could solve the problems induced by the effect of international price spikes on the currency reserves of some importing countries (rationing of food imports, decrease of the exchange rate). It could also compensate the lack of public funds necessary to manage domestic price instability.

Food aid. Food aid is a way to mitigate the effects of price spikes on low income countries and vulnerable households. This tool refers to food aid in general with its different modalities: distribution of free food ration, cash transfers, targeted subsidies, vouchers, food for work, cash for work etc. The objective is to allow the low income countries to maintain their level of import and the poor and vulnerable households to maintain their level of food consumption in spite of the price increase. This tool is off course necessary. But, since the Niger crisis of 2005, we know that this tool has proved not to be sufficient to protect poor households against food insecurity (Michiels & Egg 2008; Michiels et al. 2008; Blein& Egg 2009). Moreover, it can generate market distortions in developing countries (fall in food price that affect poor farmers).

Technical and financial support to the government of developing countries to help them to use derivatives markets. The idea is to help the government of developing countries to hedge against price spikes on international markets. This has been proposed many times by experts (Faruqee *et al.* 1997 ; Dana *et al.* 2006; Sarris *et al.* 2010). Theoretically, it should function. But this tool has serious limits. First, for some product (like rice), there is no relevant futures markets for hedging. Second, for the other products, it remains a basis risk related to the fact that the price of the food products imported is only partially correlated to the one of futures (because of differences in quality). In practice, there is only one experience of such anti-risk policy. In 2005, the government of Malawi bought a call option on maize to a South African bank (indirectly this option was related to the SAFEX). The experience was presented as a success story: it allowed Malawi to import maize at a relatively low price compared to Zambia. However, in spite of its “success”, this experience has never

been implemented again neither by Malawi nor by another country. This experience also showed that this a strong public support is a necessary condition to allow the governments to use derivative markets: the government of Malawi has received a strong technical support for the World Bank and the cost of the call option has been covered by DfID (Galtier et al. 2009, p. 124).

Credit facilities. Credit from private stakeholders is not relevant in this case: the countries are in deep difficulties and they need to receive credit very quickly. So, some public support is necessary. The IMF proposes two types of facilities: the Compensatory Financing Facility (CFF) and the Exogenous Shocks Facility (ESF). The first one (CFF) has not been used until 2000 because of its very strict conditions of use. The second one has been used by few countries in 2008 to mitigate the effect of international prices spikes for oil and food products: Ethiopia, Kenya, Kirghizistan, Malawi, Mozambique and Senegal (FAO, 2010). According to some experts, these facilities are not sufficient and other credit facilities are necessary. For instance, Sarris (2009) proposed to develop a Food Import Financing Facility (FIFF).

Public mechanism to stabilize the food import bills of specific developing countries (STABIMP). The idea is to compensate the increase in food bills induced by international price spikes. The STABEX negotiated by EU and ACP countries could be the model. This tool (that could be called STABIMP) should be targeted on low income and/or highly food import dependant countries.

International fund to finance price stabilisation policies at national or regional level in developing countries. To apply to this fund, the countries should comply with some requirements on the governance (code of practices to guarantee the transparency and predictability of interventions).
Further researches are needed to compare the performance of these tools. To a certain extent they are complementary. Taking into account the reluctance or the difficulty to use hedging tools, it is better not to rely only on it. Moreover, there is a need for an instrument that can help the countries *ex post* (in case of a price spike on international market that generates a problem of balance of payment). So there is a need for credit facilities or STABIMP. These tools can be complementary if the countries that can apply to each of them are different. The international fund seems also necessary to allow poor developing countries to develop a stabilisation policy.
Whatever the tool, a strong public support is needed, even for private ones. Hedging tools are B-instruments (theoretically private). But, as shown by the Malawian experience, a strong public support (both technical and financial) is necessary to stimulate its use. Credit facilities are also B-instruments, but for countries in a difficult situation with their balance of payments, the tools should be managed by a public institution (as the IMF).

c) Settlement, monitoring and enforcement of common rules

The role of common rules is to reduce the instability on international markets i) by restricting destabilizing behaviours from states and private operators and/or ii) by developing specific collective intervention to stabilize prices.
In the first category, we have:

Regulation of derivative markets. Many measures can be implemented, the main ones being to put position limits for non commercial operators and to tax the transactions of derivatives (Tobin type tax). The first measure may seem better as it will not affect directly commercial operators (those who are in situation to use derivatives to hedge price risks). It has also already been implemented (at the Chicago Board of Trade, from the 1930s to the 1990s) and has proved to be effective to bound over-speculation and reduce the probability of bubbles. Other measures (more linked to the organisation of derivatives markets) are also needed. For instance, it can be necessary to put in place some market authority (when it does not exist) and to harmonize the sanctions in case of market abuse.

Regulation of the use of food products to produce biofuels (flexible biofuels mandates). Theoretically, the development of biofuels can have a stabilizing effect on cereals prices. Indeed, it could make the demand for cereals more elastic (more sensitive to changes of cereal prices). But at the same time, price spikes for energy (fuel, oil…) can generate a price spike for cereals. According to some experts, it is what happened in 2007-2008 (Christiaensen, 2009). In practice, cereal supply for biofuels is not flexible: it is bound by "biofuel mandates". If the mandates are fixed, this eliminates the stabilizing effect of biofuels in case of a price shock on the cereal market. But the mandates allow to buffer the transmission of price spikes from the market of energy to the cereal market (Wright, 2009). For this, it is necessary to adjust the mandates to reduce the flow of cereals used for biofuels in case of increase in prices of the cereals. It is already partly the case in Brazil. In the USA, the law of 2008 allow to modify the mandates. Generally speaking, as the industry of biofuels is subsidised, it is possible for the states to control it. The technical feasibility of variable biofuels mandates should be investigated as an unstable supply can maybe endanger the sustainability of biofuel industry.

Creation of an international clearing house (International Grain Clearing Arrangement or IGCA). The idea is to secure the enforcement of the contracts on the physical market (between exporters and importers). The idea is the following one (Sarris, 2009). At the international level, there is no legal jurisdiction to guarantee that the contracts will be enforced. The only source of confidence between sellers and buyers are i) their will to maintain their reputation and ii) the clearing houses of the commodity exchanges. The limit of these clearing houses is double. One the one hand, there is a basis risk if the product needed by an operator is only partially correlated to the prices of the exchange (because of the transport costs and/or because of differences in quality). On the other hand, the clearing houses only guarantee a financial compensation, not the physical delivery of the product. The objective of the IGCA is precisely to overcome these limits. The IGCA would proceed through the development of links between existing commodity exchanges, with their respective clearing houses. In order to guarantee that physical supplies at various exchanges are available to execute the international contracts, part of the financial reserves of the clearing houses that would be members of the IGCA could be transformed into a physical stock, for instance by holding warehouse receipts. According to Sarris (2009) the required level of stock at each time period may not be more than 1 million tons grain equivalent, what means an amount of money managed not be larger than US$200 million. This tool aims at reducing private speculation on the physical market. However, three limits can reduce the scope of the IGCA. First, if the governments of the countries where the warehouse receipts systems are based implement export bans, this can make the physical release of stocks impossible. It is possible to manage this problem by specifying that export bans of staple food products cannot apply to the holdings of the IGCA. Second, appropriate exchanges must exist in different regions of the world. Third, most importers of the food commodity should hedge their purchases in these exchanges.

Regulation on exports restrictions. Currently, countries exporting food products have the right to restrict their exports as much as they want. Including banning completely their exports, as many of them have done during the crisis of 2007- 2008. It is not acceptable as this type of behaviours generate an increase of international prices. Some experts proposed to forbid export bans and others measures aiming to restrict exports (Lin, 2008). But this solution is not acceptable by exporting countries as shown by the international high level summit held at the FAO in Rome in June 2008. Indeed they need to protect their population in case of food price spikes on international market. The solution seems to allow the countries restrict to their imports but just in order to maintain a sufficient availability to feed their population. This means to forbid export bans at the WTO but to allow export quotas, taking into account that the amount of the quota should be indexed on the needs of the population (consumption – production – stocks). This type of measure could be benefit from the experience of the way food aid amounts are decided in the countries submitted to climatic crises. On the basis of a calculation of the estimable food balance that determines the degree of food deficit of a country, the volumes of food aid import are estimated. Following the same logic, the

minimum volume that should remain available in the country can be estimated. Of course, the exceeding part should not be blocked to export.

Regulation on land grabbling. Following the crisis of 2008, many private stakeholders or states purchased or rented land in other countries in order to secure their own supply. This kind of behaviour can generate food security problem in the countries where the land is located. It can also make international market to be very narrow and, as a consequence, more instable. Some international rules on these practices are required.

Generally speaking, these rules will reduce some sources of price instability. An alternative option (not exclusive) is to develop collective intervention in order to fight against these sources. In this second category, we have:

International public stocks for grains. Empirically, price spikes of cereals on international market have always occurred when world stocks were very low (Fig. 10 to 12). This is consistent with the idea that physical stocks are a solution for all the sources of instability: they can buffer the effect of bad harvests, they can mitigate the cobweb and discourage speculative bubbles or panic movements. This means that maintaining sufficient level of stocks is a good way to prevent price spikes on international markets.
The problem is that private stocks are suboptimal because storage is a risky activity. In order to show that private storage is optimal, Williams & Wright (1991) had to make the hypothesis that farmers and traders are risk neutral. Maybe this hypothesis is realistic for US economic agents because they have the opportunity to hedge price-risk on futures markets. But this is not realistic for many developing countries. This means that some kind of public storage is necessary in order to reach a level of stock sufficient to prevent price spikes.

Fig. 12 : International Corn Prices and Stocks 1960-2008

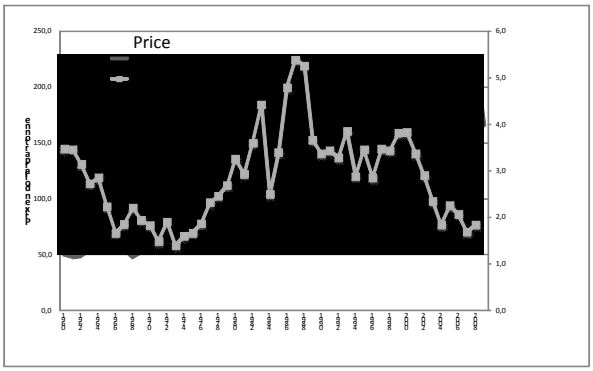


Fig. 13 : International Wheat Prices and Stocks 1960-2008

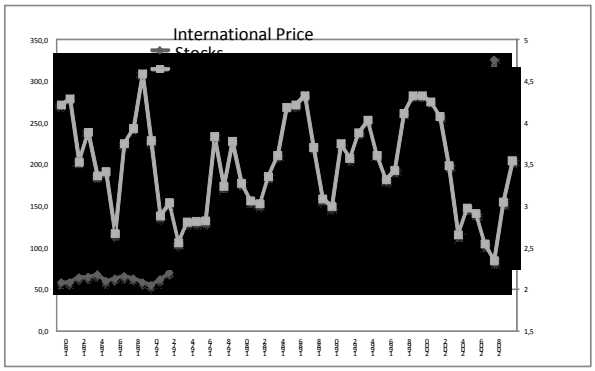
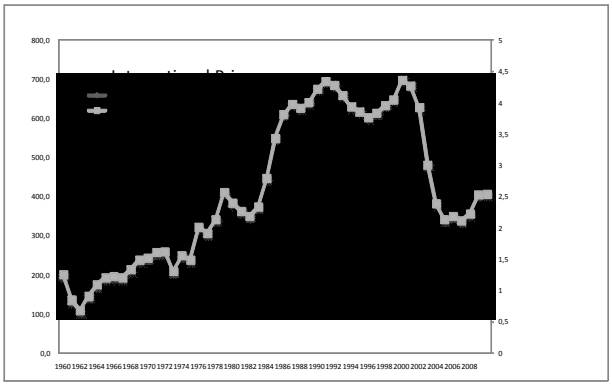


Fig. 14 : International Rice Prices and Stocks 1960-2008



But the incentive for governments to develop public stocks can also be insufficient. Most of the time, countries that maintained high level of public stocks did it to reach the objectives of their internal agricultural policy, not to stabilise international markets. However, many countries have been changing their agricultural policies (especially USA, the UE and China) for the last 20 years in a way that imply much lower levels of stock (Mitchell & Le Vallée, 2005).

As a result, an international agreement is necessary to share the burden of the storage (Lin, 2008). Otherwise, each country will be incited to act as free rider, trying to benefit from the storage of other countries without contributing itself. There are two versions to organize such a burden sharing. The "hard version" is to develop international public stocks for cereals (and maybe other food products). This can be done by using national storage facilities. In this case, part of the national public stocks is managed by some international organization. The "soft version" is an agreement in which each country commit itself to maintain at least a level of stock sufficient to cover *x* months of its own consumption. Part of this stock should be held by public agents (as private stakeholders may be incentivised to amplify price spike by speculative activities).

This type of measure is the subject of two critiques. The first one is relative to the high cost of stocks. Indeed, the immobilization of big quantities of food products represents important technical and financial costs. But if it permits to avoid the price spikes on the international markets, the benefits exceed probably the costs. The second critique is about the difficulties to organize the governance of international stocks. This difficulty would have been illustrated by the International Commodity agreements or ICAs (Gilbert 1996). These ICAs would have known all sorts of problems indeed, the main being the development of plethoric stocks (cocoa) and the rupture of the agreement following divergences between country exporters and importers (coffee). It is important however to discuss

the relevance of these critiques: the ICAs aim first at sustaining the prices that at stabilising them. And most of the problems they met come from here. The ICAs experience doesn't permit to conclude to the impossibility to manage an international public stock whose objective would be limited to price stabilization. Of course, the band of price that determines the purchases and sales of the public stock should be updated regularly in order to follow the long term trend of international prices.

International land reserves. Sarris proposed to constitute land reserves managed by the international community. These land reserves would be put in culture only in case of international price spikes. If it is less expensive to manage the fallows than to deal with physical stocks, it is a way to reduce the cost of price stabilisation. However, the inconvenience is double. On the one hand, the setting in culture takes a certain time and doesn't compensate a climatic accident. On the other hand, this measure is susceptible to generate a cobweb effect: high prices incite to cultivation of the reserves that can drive to production excesses the following year and result in a decrease of the prices. In this case, international land reserves can increase international price instability.

International virtual stock. The idea is to be able to counter-speculate on derivatives markets in case of speculative bubble (Von Braun & Torero, 2008). This proposal has been highly criticised. Indeed, it is difficult to implement. There is two reasons for this. The first one is that it is difficult (or even impossible) to estimate the price band which separate “normal prices” from bubbles. The second one is that this virtual stock can be subject to speculative attacks. So the size of the stock should be big enough to prevent such speculative attacks. It implies a very expensive stock. Even with a very big stock, this instrument is still very risky: the probability is high to loose a big amount of money. It is difficult in this condition to mobilise the international community. Last but not least, the same result (reduction of speculative bubbles) can be reach in a more effective, less costly and less risky way by regulating derivative markets.

To sum up, two categories of tools should be implemented. The one of the first category are *ex ante*: their aim is to reduce some sources of price instability by restricting destabilizing behaviours from states and private operators. The tools of the second category are *ex post*. They are ways to reduce the destabilizing effect of the different sources. Both categories are complementary.

Moreover it should be noticed that some tools are generic: they can have a stabilising impact on many sources of instability. It is especially the case of international public (physical stocks). It is a way to fight against climatic shocks, cobweb, speculation and so on. Other tools are more specific to some sources of instability or even can reduce some sources of instability but increase others (for instance the international land reserves can increase the cobweb dynamic). Hence, we have two approaches: developing a wide state of specific tools (to cover mist of the sources of instability) or developing international public stocks (or, at least, an agreement of the sharing of the burden of storage among the countries). These two approaches cab be complementary.

Last but not least, it should be noticed that national and international initiatives to manage the international prices instability are complementary but they can be also contradictory. Indeed, the reduction of the instability of the international prices can be reached to the detriment of the capacity of the countries to protect themselves of it (and vice-versa).

However both strategies are necessary. *There is a need to reduce the instability of international prices*. It is necessary to avoid the development of a generalized protectionism (self-sufficiency strategies) which would lead to an inefficient resource allocation and an increase in the average price of food. Moreover, it would narrows the size of the international market and as a consequence, makes it more vulnerable to climatic shocks (what increase price instability). This phenomenon has been observed since 2008 with a strong development of international land grabbing. It is also necessary to reduce the short-run strategies developed by the countries to protect themselves against international instability. As these strategies (especially export bans) increase international instability, their scope should be reduced.

But, at the same time, *there is also a need to allow the countries to control their import or export flows*. Indeed, the stabilisation of international price is not sufficient to stabilise the price of imported

food products: their price also depend on exchange rates and on the costs of fret. Moreover, this control of import and export can also be useful to solve domestic instability due to internal causes (as bad harvest). It is an alternative (much less costly) to the use of big national public stocks.

4.3. Elements to take into account in the design of an international governance of price instability management

All the instruments available or possible to manage price instability need international governance. Many institutions already exist but don't have always the mandate to take in charge these instruments.
In order to design international governance, it can be useful to distinguish three main functions of this governance:

- The first one is to provide **public goods** like information and knowledge in order improve coordination and decision. HLPE is in charge by CFS to provide a conceptual framework to manage price instability and to assess different strategies and instruments. This will be done in 2011 and will not become a permanent capacity of analysis like the intelligence unit proposed by Von Braun & Torero. Providing permanent information, updated diagnosis is needed and could be done by International Commodities Bodies.
- The second one is to manage financial aid or **transfers** from one country to another. This means to determine what countries will provide, what countries will benefit, and to decide amounts and implementation conditions. OECD is an example of institutions that can play this function.
- The third one is to set, monitor and enforce common **rules** for national policies. These rules can be applied to international trade, regulation of derivative markets, land grabbling and the use of food products to produce biofuels. Ad hoc mechanisms could be designed to enforce these different rules. Another option is to rely on the Dispute Settlement Body of the WTO (as proposed for instance by Von Braun and Torero for the enforcement of the international virtual stock).

In any international institution, countries are organized by geographic or economic groups. These groups are not always relevant from the point of view on how international markets affect their food security. One solution could be to organize country groups of common interest from this point of view (for example: food insecure countries highly dependent of international markets; large food exporters countries, etc.). These groups, and particularly that of the more vulnerable countries, could defend its position in several international forums.

Conclusion

The document you have just read is a summary of the work done over the past several months by approximately ten researchers, specialists themselves; their work has therefore been fed by the previous work of hundreds of other researchers and experts. They produced approximately ten papers on the various aspects of the issues around agricultural market stabilization, and they compared these papers in discussions lasting several hours. This is why drafting the summary was difficult, and why the final document is longer than initially planned.

This document does not offer "turn-key" solutions because there are none. It does, however, shed light on the state of current controversies so as to avoid giving credence to false certainties that fuel simplistic and seductive plans that are likely to end in disaster. The highlights to retain from this summary are as follows:

a) Economists now agree almost unanimously that agricultural price fluctuations are harmful for both producers and consumers equally because they blur the messages that prices should rightly send. For

most economists, it is therefore desirable that public interventions attempt to remedy these fluctuations.

b) The remedies one should envisage, if they are to be effective, lasting and widespread, depend on the causes of these fluctuations. Here, opinions diverge because two types of causes are at work:

1/ Accidental causes, called "exogenous" causes, that are independent of agents' behaviors, such as weather hazards. Insurance can be taken out to protect against the consequences of these causes, with insurance techniques based on the "law of large numbers" being both applicable and effective.

2/ "Endogenous" causes that are linked to producers' behaviors, especially when they must make their decisions without knowledge of how the market will have changed by the time their decisions bear their fruit. In this case, the difficulty is that no insurance mechanisms are possible, and any attempt to set up such mechanisms can result in virtually unlimited budget costs. Other methods—for example, establishing guaranteed prices for limited quantities—must be used, but these methods are usually in direct contradiction with the tenets of liberalism. Nevertheless, no one envisages completely eliminating markets, whose tendency to exaggeration must simply be tamed.

c) There is no consensus on which of these causes are most decisive, and therefore on which must be addressed in priority. "Liberals" believe in addressing accidental "exogenous" causes, which leads them to recommend measures such as expanding markets, developing futures markets, and disseminating information. "Regulationists", however, more concerned with "endogenous" phenomena, believe that market segmentation, supply-side control, variable customs duties, and leaving open the possibility for governments to temporarily shut their borders are indispensable measures that, far from destabilizing the world market, would on the contrary stabilize it.

d) In both cases, the question that arises is whether it would be best to intervene on the international or domestic level. And, in the later case, one must wonder whether justified and effective solutions on the national level do not run the risk of shifting the problems to international markets. There is no consensus on either of these two levels: it is admitted that "product agreements" were a failure because international organizations have been unable to maintain the necessary discipline, but one can envisage many other intervention modalities on the international level. Moreover, the international consequences of domestic interventions are still the subject of controversy, in connection with the controversies evoked above about endogenous and exogenous fluctuations. In the case of exogenous fluctuations, it is certain that the nature of domestic stabilization measures is such that they can "export fluctuations" to the international market. Inversely, in the case of endogenous fluctuations, the fact that many producing States stabilize their domestic supply should, on the contrary, mitigate global fluctuations.

e) Researchers unanimously believe that the major cause of the agricultural price instability phenomenon is to be found in the rigidity of the demand for agricultural commodities, which amplifies price variations in response to small supply variations. This is one of the specificities of agricultural commodities, which as a result should not be treated in exactly the same manner as other goods, in particular at the WTO.

f) They are also unanimous in thinking that the question of whether the most frequent and most harmful fluctuations are due to "endogenous" or "exogenous" causes must be answered objectively, based on history and econometric models, whose results must be discussed as widely as possible without ideological or political preconceptions, according to the rules of the scientific method.

We could be content with "fueling the controversy" if it were not for the fact that the erratic life of agricultural markets has a strong impact on the lives of billions of people, especially those living near the poverty line. It so happens that excessively powerful mechanisms of enrichment and pauperization hide at the heart of agricultural and food markets. In other words, while these

mechanisms provide wealth to a select few, they bring marginalization, debt and exclusion to the majority of producers, and pull poor consumers into a downward spiral of debt and hunger.
It is policy makers' job to decide how to confront these issues—that is, it is their job to design and implement public policies and negotiate international agreements. It is our job to provide as much information as possible so that their decisions can be enlightened.

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Annex 1. Table of countries, products and periods studied

Annex 2. Table of instruments used in case studies

			Thailand	India	Indonesia	Guinea	Burkina	Madagascar	Mali	Kenya	Zambia
C	Frontiers measures	Import control			X	X		X	X	X	X
		Export control	X	X				X	X		
	Domestic measures	Buffer stock	X	X	X					X	X
		Input subsidies	X	X	X	X	X	X	X		X
A	Harvest credit		X					X			
	Smoothing fund						X				
D	Security stock		X						X	X	X
	Consumption subsidies			X			X	X			X

Annex 3. Importance of effectiveness, predictability and appropriateness to fit a plurality of interests on public instruments

	Effectiveness		Predictability	Appropriateness to fit a plurality of interests
	Financial capacity	Enforcement control		
Trade control		X	X	X
Stocks management	X X		X	X
Production support	X			X